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Sexual and Reproductive Behaviour of HIV-positive Men and the Response of the Health Care Service: A Mixed Methods Study in Kano, Northern Nigeria

Zubairu Iliyasu MBBS. MPH.

Thesis Submitted for the Degree of Doctor of Philosophy

School of Health and Related Research

Faculty of Medicine, Dentistry and Health

University of Sheffield

November 2017

Abstract

Background: HIV/AIDS remains a major public health challenge in sub-Saharan Africa. Despite their important role in the spread of HIV, the impact of a HIV-positive diagnosis and treatment on the sexual and reproductive behaviour of heterosexual Nigerian men is under-researched.

Aim: To determine the sexual and reproductive behaviour of HIV-positive men in Kano, Nigeria in the era of antiretroviral therapy and the health care service response.

Methods: A sequential, explanatory mixed methods design was used. First, a quantitative study collected and analyzed survey data on a clinic-based sample of HIV-positive men (n=270) and matched controls (n=270). This was followed by in-depth interviews with a sub-sample of survey participants (n=22) and health workers/health managers (n=5).

Findings: Compared to controls, a greater proportion of HIV-positive men were sexually active (91.9% vs. 82.2%, P<0.05). However, they had reduced coital frequency, out of fear of transmission, psychological effect, energy expenditure and perceived nutrient loss. Post-diagnosis consistent condom use was higher compared to controls (18.9% vs. 13.0%, P<0.05). Lack of interest, reduced pleasure, partner's refusal and desire to conceive were the reasons for low condom use. A smaller proportion of HIV-positive men desired more children than controls (79.3% vs. 91.1%, P<0.05) and intent to have a child within three years (57.0% vs. 67.0%, P<0.05).

Being married and employed significantly predicted sexual activity among HIV-positive men. Also, marital status, religion and spousal HIV status predicted risky sexual behaviour while fertility intention was predicted by marital status and duration, religion, employment and existing children. Late diagnosis, inadequate health worker safe conception skills were evident.

Conclusions: The majority of HIV-positive men were sexually active and desired to have children, but the health care service response was inadequate. The findings highlight the need for improved reproductive health education and services to reduce risky behaviour and promote safe conception.

Acknowledgements

I wish to start by extending my gratitude to my research supervisors, Dr Jenny Owen and Professor Padam Simkhada for their tireless efforts at seeing to the timely completion of this thesis. I also thank my personal tutor Dr Edith N Poku for checking to make sure I made steady progress. I want to also appreciate Dr. Andrew Booth and Anthea Sutton of ScHARR information services for their guidance on systematic reviews. I also thank the organisers of the 'Regression Models as a Tool in Medical Research 2013' course at the University of Freiburg, Germany for the opportunity to learn STATA. Similarly, my gratitude goes to the DFID/ORIE project for the research grant and Nvivo training. I also wish to appreciate Dr Tom Gommersal for his practical guidance on qualitative data analysis.

Away from Academics, I wish to thank Mr Graham Jones for initiating the Bayero University-University of Sheffield collaboration and for being a good host. I also appreciate the immense help I got from Dr Muhammad Saddiq and his family during my stay in Sheffield.

I extend my appreciation to my employers, Bayero University Kano, Nigeria for sponsoring my PhD. I wish to also thank my research assistants, Mallam Aliyu Tambaya Mande and Dr. Musa Mohammed Bello and my colleagues at Bayero University and ScHARR, Professors Mohammed Kabir, Isa S. Abubakar, Sanusi Abubakar and Umar Muhammad Lawan. I also thank Professors Muktar H. Aliyu of Vanderbilt University and Hamisu M. Salisu of Baylor College of Medicine, Houston, Texas for their friendship and collaboration over the years. I also thank the management of Aminu Kano Teaching Hospital, Staff of SS Wali centre, General Outpatient department, patients, officials and members of PLWHA support groups for their cooperation towards the successful conduct of this study. My appreciation also goes to Drs Chima Onoka and Amina Ibrahim Abba for accepting to proof read this work at short notice.

On the home front, I appreciate the love, peace, support and understanding of my wife Hajiya Sa'adatu M. Nasir and daughters Bilkisu, Aisha and Fatima throughout this academic pursuit. This work is dedicated to my parents Hajiya Dudu Iliyasu and Late Mallam Iliyasu M. Yelwa for instilling in me the values of hard work, discipline and honesty.

Table of Contents

List of Tables

Chapter 7 Findings: Reproductive behaviour of HIV-positive men versus controls

Chapter 8 Findings: Health care service response

List of Figures

List of Abbreviations

AIDS Acquired Immunodeficiency Syndrome

AJOL African Journals Online

AKTH Aminu Kano Teaching Hospital

ANC Antenatal Care

ART Antiretroviral Therapy

ASSIA Applied Social Sciences Index and Abstracts

BHIVA British HIV Association

CAQDAS Computer Assisted Qualitative Data Analysis

CASP Critical Appraisal Skills Programme

CDC Centers for Disease Control and Prevention

CD4 Cluster of Differentiation 4

CINAHL Cumulative Index of Nursing and Allied Health Literature

CRD Centre for Reviews and Dissemination

CROI Conference on Retroviruses and Opportunistic Infections

ELISA Enzyme Linked Immunosorbent Assay

FGD Focus Group Discussion

FMOH Federal Ministry of Health

GHAIN Global HIV AIDS program in Nigeria

GOPD General Outpatient Department

GNP+ Global Network for and by People living with HIV

HAART Highly Active Antiretroviral Therapy

HAST HIV/AIDS and sexually transmitted infections and tuberculosis counselling

HIV Human Immunodeficiency Virus

HND Higher National Diploma

ICPD International Conference on Population and Development

ICW International Community of Women Living with HIV

IDI In-depth Interviews

IHVN Institute of Human Virology of Nigeria

IPPF International Planned Parenthood Federation

IVF In-vitro Fertilisation

ITWG Integration Technical Working Group

MeSH Medical Subject Headings

NACA National Agency for Control of AIDS

NARHS National HIV/AIDS and Reproductive Health Survey

NDHS Nigeria Demographic and Health Survey

NDLEA National Drug Law Enforcement Agency

NPC National Population Commission

OR Odds Ratio

PEPFAR US President Emergency Plan for HIV/AIDS Relief

PICOCS Population, Intervention/Exposure, Comparators, Outcome, Context and Study design

PLWHA People Living with HIV/AIDS

PMTCT Prevention of Mother to Child Transmission

PrEP Pre-Exposure Prophylaxis

PRISMA Preferred Reporting Items for Systematic Reviews and Meta-Analyses

SOP Standard Operating Procedure

SRH Sexual and Reproductive Health

STI Sexually Transmitted Infections

UNAIDS United Nations Agency for the control of AIDS

UNFPA United Nations Population Fund

VCT Voluntary Counselling and Testing

Chapter 1 Introduction

1.1 Background

When five cases of *pneumocystis carinii* (now *pneumocystis jiroveci*) pneumonia were reported among previously healthy homosexual men on the 5th of June 1981 in Los Angeles (CDC, 1981), little did the world know that it heralded one of the major public health challenges of this generation. At the end of 2015, an estimated 78 million people have been infected worldwide with HIV since the beginning of the epidemic (UNAIDS, 2016). Of these, 36.7 million people were living with HIV while the rest had died. In Africa, HIV is predominantly transmitted through unprotected sexual intercourse, vertically from mother to child and via unscreened blood or unsterile injections. AIDS syndrome results from HIV infection which causes progressive loss of CD4+ helper subtype of T lymphocytes (Fauci, 1988). It manifests with features of impaired immune function, opportunistic infections, cancers and neurological complications (Weiss, 1993). Without treatment, the prognosis is grave (Holkova, 2001).

Africa's population of over one billion people account for less than 15% of the global population (Population Reference Bureau, 2016), but the continent is home to more than two-thirds of the world's HIV-positive people (UNAIDS, 2016). This disproportionate burden on countries with the weakest health systems left a trail of death, misery and despair. The hardest hit countries were among the least prepared and had struggled with the devastating effects of this epidemic since (Buvé, Kalibala & McIntyre, 2003; Naicker et al., 2009).

Although countries in east and southern parts of Africa are more severely affected by the epidemic (Buvé, Bishikwabo-Nsarhaza & Mutangadura, 2002), Nigeria, the most populous country located in west Africa, with over 167 million people (NPC, 2006) has not been spared. The National HIV/AIDS and Reproductive Health Survey-Plus (NARHS Plus) reported a seroprevalence of 3.4% with regional figures ranging from 0.2% to 15.2% in 2012 (FMOH, 2012b). Although studies have identified youths, commercial sex workers and long distance transport workers among the most-at-risk populations, no group is completely safe (FMOH, 2013). Similarly, while women and children bear the brunt of the epidemic, men are not exempt.

Kano, the most populous state in northern Nigeria and the region's commercial hub, has attracted people from across the country and beyond. The HIV sentinel surveys in Kano state reported prevalence of 4.3% in 1999 and a slightly lower value of 4.1% in 2003 (FMOH, 1999; FMOH, 2003). Subsequent surveys found lower figure of 2.2% (FMOH, 2008) which increased to 3.4% in 2010 (FMOH, 2010). The most recent survey in 2012 returned a figure of 1.4% in the State as against a national prevalence of 3.4% from the same survey (FMOH, 2012b). The survey conducted in 2008 also reported prevalence of HIV among most-at-risk groups in Kano State (FMOH, 2008). The figures were 49.1% among brothel based commercial sex workers, 44.1% among non-brothel based commercial sex workers and 11.7% among men who had sex with men. Other prevalence figures were 10.1% among intravenous drug users, 4.4% among the police, 3.7% among other uniformed armed personnel and 1.4% among long distance transport workers.

Though Kano State's HIV prevalence has been lower than the national figures, it's high population translates to an estimated 374,000 people living with HIV/AIDS, out of which only 106,000 have been diagnosed and registered in health facilities providing ARV services. Similarly, with a high total fertility rate of 6 per woman, the State makes a significant contribution to the mother to child transmission burden in Nigeria. With an estimated 19,067 pregnant HIV-positive women projected from 560,784 pregnant women and HIV prevalence of 3.4% in 2010, potentially a third of the babies born would be HIV-positive in the absence of PMTCT interventions. Therefore, the state could contribute 6,355 children to the Nigerian national pool of infected children, some of whom would be orphans.

Disturbing as the current global HIV statistics may seem, the rates were even higher during the peak of the epidemic (UNAIDS, 2012). Fortunately, over the last decade, the number of new infections and HIV-related deaths have dropped by 33% and 29% respectively (UNAIDS, 2013). In the same vein, incident HIV infections among children have reduced by more than half globally (UNAIDS, 2012). Specifically, new HIV infections in Nigeria have reduced by over a third in the preceding three years (UNAIDS, 2014b). However, the challenges posed by HIV/AIDS are far from over (WHO, 2013).

Several factors modulate the sexual transmission of HIV at the population level. They include frequency of sexual contact between serodiscordant partners and the likelihood of transmission during each contact (Kapiga, Hayes & Buvé, 2010). Sexual behavior patterns, number, types and serostatus of sexual partners underlie encounters between serodiscordant

partners. The chance of transmission depends on consistency of condom use, presence of STIs (e.g. syphilis and herpes simplex virus 2 (HSV-2) and other genital infections, male circumcision and level of infectiousness of the HIV-positive partner (stage of the disease, viral load and treatment adherence) and the susceptibility of the seronegative partner (Kapiga, Hayes & Buvé, 2010; Royce et al., 1997; Vernazza, 1999). In addition to these biological factors, complex sociocultural and contextual factors could influence these interactions.

Encouragingly, worldwide, access to antiretroviral treatment has also improved 40-fold between 2002 and 2012 (UNAIDS, 2013). With an increase from 19% to 56%, sub-Saharan Africa had one of the fastest rates of increase over this period (UNAIDS, 2012). The recent recommendation to treat all people that test positive to HIV has increased the number of ART-eligible people from 28 million to 37 million (WHO, 2016). Although antiretroviral treatment is not yet universally accessible in Nigeria, nearly a third of those that are infected (1.5 million) are on ART (NACA, 2012). This improved access to treatment has renewed hope for a longer and more fulfilled life among people living with HIV/AIDS (PLWHAs).

The influences of chronic illnesses including HIV/AIDS on lifestyle has been extensively studied (Shaul, 2012; Larsen, 2013). Most affected people make adjustments to regain some state of 'normalcy' in the face of such challenges (Parker, 2007). The level of functioning reached may vary among individuals and could reach or fall short of the pre-morbid levels depending on the nature and severity of the disease (Joachim and Acorn, 2000). In particular, the effect of HIV/AIDS on the sexual and reproductive lives of those affected has generated a lot of interest among researchers for several reasons (Sneeringer, 2009). First, the life shattering nature of HIV-positive diagnosis and its perception by many as a death sentence (Jha and Plummer, 2011), particularly in developing countries. Secondly, in the absence of preventive strategies, there is a potential risk of transmitting HIV to sexual partners and the offspring (Levine & Dubler, 1990). There is an additional risk to the baby during delivery and breastfeeding. Furthermore, the stigma and discrimination associated with the infection is far reaching, especially, during the early phase of the epidemic (Green, 1993). All these could lead to adjustments in sexual and reproductive behaviour among those affected.

In the developing countries including Nigeria, the effects of HIV-positive diagnosis on the sexual and reproductive behaviour of HIV-positive women have been extensively studied (Nattabi et al., 2009; Makwe and Giwa-Osagie, 2013; Iliyasu et al., 2009; Oladapo et al.,

2005). However, its impact on sexual and reproductive behaviour of heterosexual men has not been well documented. In addition, there is a tendency to deny the sexual and reproductive rights of people living with HIV as reproduction is considered the function of the fit and healthy (Gosselin & Sauer, 2011; Sauer, 2005; Daar & Daar, 2006).

To address the peculiar needs of HIV-positive men and their partners, it is important to understand the influences of HIV-positive diagnosis and treatment on men's sexual activity and their desires for fatherhood. Specifically, it is conceivable that facing hard choices, HIV-positive men may re-assess and alter their behaviour regarding courtship, marriage and procreation. Furthermore, to avoid the consequences of disclosure, they may choose only HIV-positive partners. This tendency to sero-sort is unsafe as it engenders complacency thereby increasing the risk of acquiring new strains of the virus (Reniers and Helleringer, 2011).

With the majority of HIV-positive people in developing countries still within the reproductive age group (Mantell, Smit & Stein, 2009; UNAIDS, 2012), and the cultural premium accorded to child bearing, those desirous of parenthood could also face difficulties not only because of the risk of infecting their spouses and potentially, the children, but also the effects of childbearing and rearing on their health (Antle et al., 2001). In the early days of the epidemic, stigma and cultural misgivings about caesarean delivery and alternative infant feeding also confronted these couples as they struggled to realise their reproductive goals (Enwereji & Enwereji, 2010). Furthermore, this is compounded by non-responsive health care services to meet the sexual and reproductive health needs of those affected (WHO, 2005). Similarly, unsupportive health care workers' attitudes discouraged some HIV-positive couples from actualizing their fertility desires (de Bruyn et al., 2004; Paiva et al., 2003). For instance, in the early days of the epidemic, some health workers cautioned HIV-positive couples against pregnancy (O'Sullivan & Thomson, 1992). Paradoxically, even those that desired no children had limited access to contraceptive information and services (Halperin, Stover & Reynolds, 2009; Laher et al., 2009).

Although studies have been conducted on the effect of the HIV epidemic on sexual and reproductive behaviour of PLWHA in different settings (O'Sullivan & Thomson, 1992; Setel, 1995; Beyeza-Kashesya et al., 2011; Nattabi et al., 2009; Berhan and Berhan, 2013), the dearth of information about HIV-positive men in particular was clearly shown in a review

where only two of the 29 eligible studies focused exclusively on reproductive preferences of men, while the rest studied women (Nattabi et al., 2009). The two studies that focused on men were from the UK (Sherr and Barry, 2004) and Brazil (Paiva et al., 2003), where the cultures are so different from northern Nigeria. These studies showed that the epidemic could modulate fertility desires bi-directionally and to varying degrees (Nattabi et al., 2009). Compared to the situation during the early phase of the epidemic, when HIV-positive couples commonly reported a reduced desire to procreate (Desgrées-Du-Loû et al., 2002), recent studies found an increased desire for childbearing among PLWHAs (Maier et al., 2009). An unsolved puzzle is whether it is the hope of longevity and feeling of wellbeing following ART that rekindled the desire for parenthood or other complex extraneous factors are at play.

A study in Uganda found that relative to their uninfected counterparts, men and women living with HIV were six times less likely to want more children (Heys et al., 2009). In the same country, women living with HIV were less desirous of having more children compared to HIV-positive men (Nakayiwa et al., 2006). A similar pattern was observed in south west Nigeria, where relative to women, men wanted more children post-HIV diagnosis (Oladapo et al., 2005). A study in northern Nigeria before the widespread availability of ART found that almost equal proportions of HIV-positive men (61.2%) and women (65.5%) were desirous of parenthood (Iliyasu et al., 2009). Whether these proportions have remained same in this part of Nigeria following increased access to ART is unknown. Important questions that remain unanswered include: What are the sexual and reproductive behaviour of HIV-positive men receiving ART in Kano? During the era of ART, do men alter their sexual and fertility behaviour on discovering their HIV-positive status? If they do, what are the reasons? How do the sexual and fertility behaviours of HIV-positive men compare with those of their untested or HIV-negative contemporaries? Importantly, how do HIV-positive men understand and interpret their situation regarding relationships, marriage, sexual intimacy and fatherhood? What factors influence the sexual and reproductive behaviours of HIV-positive men? And how responsive has the health care services being to the sexual and reproductive health needs of HIV-positive men? These are the questions this thesis wants to address.

1.2 Statement of the problem

In countries with high burden of HIV/AIDS, the effects of the epidemic have been far reaching at individual, household and community levels (Hosegood et al., 2007). Researchers have investigated the influence of the epidemic on various aspects of life including sexual

and reproductive behaviour in different settings (Allen et al., 2003; Bunnell et al., 2006). This is especially important in sub-Saharan Africa considering the predominantly sexual route of transmission (Morison, 2001). At the beginning of the epidemic, pregnancy was discouraged among HIV-positive couples and some even recommended that HIV-positive women cease childbearing altogether (Mofenson, 2010). This was informed by the limited knowledge and deleterious effects of HIV on maternal health, pregnancy outcomes and high vertical transmission risk (CDC, 2006a). Others went as far as offering termination of pregnancy to HIV-positive women (CDC, 2006b). However, reproductive instinct was so powerful that despite testing positive to HIV, some women still conceived and delivered HIV-positive babies, most of whom unfortunately died (Selwyn et. al 1989). The demonstration of HIV RNA in seminal fluid and its adverse effects on semen parameters raised concerns about the fertility of HIV-positive men (Bujan et al., 2007; Le Tortorec, 2010). Based on suspicions of deleterious effect of nucleoside reverse transcriptase inhibitors (NRTIs) on mitochondria, researchers examined the semen qualities of ART naïve HIV-positive men starting treatment. They found decreased ejaculate, low acidity and fewer forward moving sperm compared to samples from HIV-negative men. In addition, after 48 weeks of treatment, the proportion of active forward moving sperm significantly reduced from 28% to 17% (Bujan et al., 2007). This concern was accentuated by the untoward effects of the infection on testicular germ cells, spermatogenesis, libido and erectile function (Shevchuk et al., 1999).

The breakthrough of highly active antiretroviral therapy transformed HIV infection to a chronic manageable condition, even in resource-poor settings (Paterson et al., 2000; Levi et al., 2002; Tran et al., 2011). It changed the landscape dramatically bringing hope and improved quality of life to PLWHAs. Similarly, the effectiveness of combining antiretroviral drugs, elective caesarean delivery and infant feeding substitutes on vertical transmission risk reinforced the hope of reproduction among HIV-positive couples (Mandelbrot et al., 1998). This optimism was further heightened by scientific advances in artificial insemination and sperm washing making it possible for HIV-positive men to father a child without infecting their partners or the baby (Semprini, Fiore & Pardi, 1997; Marina et al., 1998). Recommendations regarding reproduction also transformed from avoidance of pregnancy to ensuring safe conception (Chadwick et al., 2011).

An array of safe conception strategies evolved including: home based manual insemination, unprotected sexual intercourse during peak fertility, sperm washing (Vernazza et al., 2011; Bekker, 2011) and medical circumcision for uninfected men (Gray et al., 2007; Bailey et al.,

2007). These strategies altered the reproductive outlook of HIV-positive couples. While some of the less technologically intensive methods (e.g. home-based manual artificial insemination and timed sexual intercourse) are within the capacity of low-resource settings, same cannot be said about the high-tech methods such as sperm washing. Paradoxically a high cultural premium is placed on childbearing, in large numbers in most low-resource countries (Isiugo-Abanihe, 1994; Dyer, 2008). It is unclear if HIV-positive men in northern Nigeria are aware of the existence of safe conception methods. If they do, how acceptable and accessible are these services? Similarly, for HIV-positive men whose partners choose to stop child bearing, how accessible are family planning information and services? It is yet to be determined how responsive the health care service in Kano, northern Nigeria is to the specific sexual and reproductive needs of HIV-positive men and their partners.

An understanding of how HIV-positive diagnosis and its treatment modulate sexual behaviour (in terms of libido, sexual activity, coital frequency and safe sex), fertility desires (wish to have more children) and short term (≤3 years) intention to bear children is of particular interest for several reasons. First, men are key players in the heterosexual spread of the infection in sub-Saharan Africa. Secondly, in patriarchal societies such as northern Nigeria, unequal power exists in gender relationships. Men are powerful and very influential, as they determine to a large extent the number of sexual partners, when sexual relations occur and are required to provide permission for partner's access to family planning services (Duze and Mohammed, 2006). In addition, they also control the family's resources and influence their use, even for emergency health care (NPC, 2009). Therefore, knowing their sexual and reproductive behaviour pattern would inform the re-organization of reproductive and sexual health services to address any gaps, particular needs and challenges faced by men and their partners in these settings. It therefore, underscores the significance of studying the sexual behaviour, reproductive desires and intentions of these important but often ignored stakeholders, whose cooperation is essential in curbing this epidemic.

Important questions that deserve further inquiry include: How do HIV-positive men perceive the influences of HIV-positive diagnosis and ART on their sexual and reproductive lives? Is their sexual and reproductive behaviour any different from their HIV-negative or undiagnosed contemporaries? If so, what are the reasons and motivations that underlay any changes in behaviour? Are HIV-positive men aware of safe conception methods and HIV risk reduction strategies? Do they apply these strategies? How responsive has the health care service being to the realization of safe sex and fatherhood among HIV-positive men? The

information could inform policy and programmes targeted at protecting the reproductive rights of HIV positive couples, especially men.

1.3 Justification for the study

There is compelling evidence that in sub-Saharan Africa, the dominant route for HIV transmission is through heterosexual intercourse (Buvé, Bishikwabo-Nsarhaza & Mutangadura, 2002), and three-fourths of HIV-positive people are within the reproductive age group (UNAIDS, 2012). Earlier in the course of the epidemic, pregnancy was discouraged among HIV-positive couples. However, with the advent of effective means of preventing mother to child transmission, such restrictions were relaxed (Chadwick et al., 2011). Over the past decade, there has been remarkable improvement in quality of life and prognosis of PLWHA as a result of increased access to antiretroviral treatment (Yeni et al., 2004; Castelnuovo, Kiragga, & Schaefer, 2009). These changes have dramatically altered the hopes, aspirations and reproductive outlook of those affected.

Researchers have focused mainly on the effects of the epidemic on the sexual and reproductive behaviour of women to the neglect of men. This is in spite of calls at the International Conference on Population and Development (ICPD) that reproductive and sexual health programmes should pay attention to the important roles and responsibilities of men in family life and reproductive health (UNFPA, 1995). With the power balance in favour of men in patriarchal societies such as northern Nigeria, the study site, practice of polygamy and men's vital role in reproductive decision-making, it is important to explore the consequence of the epidemic and its management on men's sexual and reproductive behaviour. In addition, an assessment of the health care service response to their unique needs could inform measures to safeguard HIV-positive men's sexual and reproductive rights, enhance the protection of their partners and the future generation. This would contribute towards curbing the spread of the infection. It is known that the perceptions and attitudes of health workers could assist or impede the utilization of SRH services (Harries et al., 2007). Yet, in parts of Africa, little is known about the knowledge, attitude and safe conception skills of health workers.

Health care services in Kano State are organized at three levels, the primary, secondary and tertiary as in other parts of Nigeria. Primary Health Care (PHC) services are the lowest level of care. There is one PHC centre for each political unit (called ward) inhabited by

approximately 10,000 people. Residents within 5 kilometre radius or half an hour travel time to the health facility are expected to access services from the centre. Each PHC centre has at least a Community Health Officer, four midwives, and three Community Health Extension workers as a minimum. They provide a package of essential health care with referral linkage to a secondary health centre. The primary health care centres are managed by the state primary health care management board with overall supervision from the National Primary Health Care Development Agency (NPHCDA). There are 1,132 health facilities in Kano state, 638 of which provide antenatal care services (ANC). Out of this number, 139 provide HIV counselling and testing (HCT) and PMTCT services. In addition, they have referral linkages with higher (secondary or tertiary) levels of care. Secondary health facilities are called general hospitals. They receive funding from the State government and are managed by the hospital services management board. There is one in each local government administrative headquarter staffed by general practice medical officers, pharmacists, nurses and midwives among others. They receive patients on referral from PHC centres or directly from their catchment populations. They all provide HCT and PMTCT services as part of antenatal, delivery and postnatal care. They in turn refer patients who require ART to the tertiary health centres. The tertiary hospital (Aminu Kano Teaching Hospital, where SS Wali centre is located) is a specialist centre with consultant grade physicians, obstetricians and gynaecologists and other specialists. It is the main site where ART services are provided to patients from across the state and neighbouring states. This specialist centre receives referrals mainly from the secondary levels of care (General hospitals). However, occasionally patients are referred directly from primary health care level to tertiary level by-passing the secondary level. In addition, some patients present directly at the general outpatient department of the teaching hospital. The specialist centre provides HCT, comprehensive PMTCT and ART services. The Murtala Muhammad Hospital, Abdullahi Wase Hospital and the Infectious Diseases Hospital are other sites within Kano where ARV treatment is provided. However, far smaller numbers are seen at these centres. The referral system is two-way, in that after stabilization, patients are referred back to lower levels of care from the tertiary level. In addition to the public sector, private health facilities provide services at primary and secondary levels. In addition, private pharmacies sell over-the-counter drugs and prescription drugs, but ARTs are strictly dispensed at the treatment centres. Most private health facilities are concentrated in the state capital or local government headquarters with very few in rural areas. Traditional healers and spiritualists are also patronized, especially in the rural areas.

There have been efforts to encourage referrals by traditional healers and traditional birth attendants to the formal health sector with little success.

Located in north west Nigeria, Kano State had an estimated population of 11,215,688 people (based on 2006 census figures). It is the most populous state in northern Nigeria. Of this projected figure, 2,467,451 (22%) are women of child bearing age (15-49 years) and 2,364,851 are men. The inhabitants of Kano are predominantly Hausa, Fulani Muslims. However, there are substantial proportions of other Nigerian tribes and a Christian minority. The state is made up of 44 local government areas, eight of which are urban while the rest are rural. The culture has had a strong Islamic influence. Beyond northern Nigeria, the Hausa-Fulanis are found over a wide area of West Africa and in neighbouring Niger. Their estimated figures are as follows: northern Cameroon (556,000), TChad (462,000), Ghana (655,000), Sudan (357,000), Ivory Coast (224,000), Benin (54,000), Gabon (27,000), Togo (35,000) and Senegal (58,000) (Population Reference Bureau, 2016). Although, there may be variations in the economic conditions and health services across these countries, the shared culture and religious practices could have similar effects on the sexual and reproductive behaviour of men living with HIV/AIDS over this vast area. The findings of this study could therefore, be of interest to health managers and researchers in these other countries.

This study is unique in many respects: it is the first study to focus exclusively on a long neglected subject, the sexual and reproductive behaviour of HIV-positive men in northern Nigeria. This study is also comparative; it relates the sexual and reproductive behaviour of HIV-positive men with their pre-HIV state and their HIV-negative or untested counterparts in the same setting. To this researcher's knowledge, no comparative study of this nature has been reported among HIV-positive men in Kano, northern Nigeria.

Considering the risk of horizontal and vertical transmission to the partner and offspring respectively, physical effort involved in sexual intercourse and child rearing, this study hypothesizes that HIV-positive men would report a reduced level of sexual activity and increased use of protection than their untested or HIV-negative counterparts. Secondly, they would desire and intent to have fewer children as suggested by others (Lindegren et al., 1999). In addition, it is also expected that fertility desire and intention of HIV-positive men would vary by socio-demographic characteristics such as age, marital status, income, education, religion, previous fertility, perceived health status and pre-morbid fertility desire.

Contemporary reproductive health programmes still suffer from the hang-over effect of pre-HIV family planning era which erroneously assumed that their client is a married woman in a stable monogamous setting with rights to make independent decisions. Nothing can be further from reality, especially, in patriarchal cultures such as the study area, where men wield enormous powers in all aspects of family life (Duze and Mohammed, 2006).

Men who are provided with sexual and reproductive health information tend to support their partners to access these services (UNFPA, 1995). And not only that, men are likely to be encouraged to accompany their spouses and voice their reproductive health problems. Generally, policy makers and HIV programmes have not prioritized the reproductive health needs of men in northern Nigeria. The extent of the response of the health care service to the evolving needs of this group is not known. Furthermore, the choice of a mixed methods design did not only quantify any differences in behaviour but provided context and insights into the reasons why they occurred.

1.4 Research questions

In the questions below, sexual and reproductive behaviour is defined as including pre-marital, marital and extra-marital relationships, sexual activity, coital frequency, safe sex practices (e.g., condom use, antiretroviral prophylaxis), condomless sex and reproductive decisions/aspirations. The research questions in this study are:

1. What are the sexual and reproductive behaviour of HIV-positive men on ART in Kano, northern Nigeria?
2. Are there changes in men's sexual and reproductive behaviour following HIV-positive diagnosis and antiretroviral therapy?
3. What are the reasons for change, if any?
4. How does the sexual and reproductive behaviour of HIV-positive men on ART compare with matched controls?
5. How do HIV-positive men understand and interpret their situation with respect to relationships, marriage and fatherhood? (e.g. barriers, opportunities and cultural influences that affect their choices)
6. How has the health care service responded to HIV-positive men's needs (e.g. in improving access to health information and services) to ensure safe choices about sexual intimacy and fatherhood?

1.5 Study aim and objectives

The aim of this study is to determine the sexual and reproductive behaviour of HIV-positive men on antiretroviral therapy and the response of the health care service in Kano, northern Nigeria

The specific objectives are:

1. To determine the sexual and reproductive behaviour of HIV-positive men on antiretroviral therapy (ART)

2. To compare sexual behaviour of HIV-positive men on ART with matched controls

3. To compare the reproductive desire and intentions of HIV-positive men on ART with matched controls

4. To identify predictors of sexual and reproductive behaviour of HIV-positive men on ART

5. To explore the perspectives of HIV-positive men on the effects of HIV diagnosis and ART on their sex lives and choices about marriage and fatherhood

6. To assess the health care service response to the sexual and reproductive health needs of HIV-positive men

1.6 Thesis outline

This thesis is made up of eight more chapters. Chapter 2 is the narrative literature review which begins with the scoping search strategy, basic definitions and a critical review of existing studies on sexual and reproductive behaviour of HIV-positive heterosexual men. It also provides the conceptual framework of the study and gaps in knowledge that the study seeks to fill. Chapter 3 presents the methods and results of a systematic review of the sexual and reproductive behaviour of HIV-positive heterosexual African men in the antiretroviral era.

Chapter 4 describes the planning and conduct of the study starting with a description of the study design, sequential explanatory mixed methods, its rationale and evolution. This is followed by the description of the study site, study population and sampling methods. Thereafter, a figure provides a visual display of the survey and semi-structured interviews. Furthermore, an account of the data collection, management and analysis process are given.

The section is concluded with a description of ethical considerations and a reflection on the researcher's position in the whole research process. Chapter 5 describes the socio-demographic characteristics and clinical profile of HIV-positive men and controls in the quantitative study. In addition, it describes the circumstances and motivations for taking the HIV test, how these men reacted to a positive result and whether or not they disclosed to others and why? Chapter 6 examines the influence of HIV-positive status and its treatment (ART) on men's sexual behaviour. Libido and sexual activity were compared before and after HIV-positive diagnosis followed by a comparison with matched controls.

Chapter 7 presents the reproductive behaviour of HIV-positive men and matched controls. It compares the number of children already fathered by HIV-positive men and controls. It is followed by a description of HIV-positive men's future fertility desire and intention and how these compare with controls. Chapter 8 details the health care service response to the sexual and reproductive health needs of HIV-positive men from the perspectives of health managers, health workers and men living with HIV. Finally, Chapter 9 discusses the key findings, the contribution of the study to knowledge and compares the findings with existing literature. This is followed by interpretation, a discussion of strengths and limitations, and implications for further research, policy and practice.

Chapter 2 Literature Review

2.1 Scope and organisation of the literature review

This chapter outlines the scoping and focused search strategy used to assemble materials for the narrative literature review, provides basic definitions, behaviour change theories and reviews the existing studies on sexual and reproductive behaviour of HIV-positive men and associated factors. It is centred on the research questions outlined in the preceding chapter and provides a conceptual framework underpinning the study. In addition, it highlights the knowledge gaps that the study seeks to address.

2.2 Literature search strategy

2.2.1 Scoping search

An initial scoping search conducted in Google™ Scholar and Scirus™ identified popular key words used for indexing the concepts under study. These key words enhanced the yield from databases by increasing the sensitivity of the search (EPPI-Centre, 2008). Wildcat truncation was also used for words with alternative endings or different American and British spellings (*, # or $, depending on the database specification). The indexed key words were further employed in advanced search facilities of several databases. The key terms and concepts are presented in Table 2.1.

Table 2.1 Concepts and indexed key words

Concept	Indexed key words
Sexual behaviour	Sexual behaviour, sexual behavior, sexual attitude, sexual lifestyle, sexual risk behaviour, risky sexual behaviour, high risk sexual behaviour, sexual activity, premarital sex behaviour, sex, coitus, sexuality, premarital sex
Reproductive behaviour	Reproductive behaviour, fertility behaviour, contraceptive behaviour, voluntary childlessness, delayed childbearing
HIV/AIDS	HIV seropositivity, AIDS seropositivity, Anti-HIV positivity, HTLV-III seropositivity, HIV seroconversion, HTLV III seroconversion, AIDS seroconversion, HIV antibody positivity, HIV infection
Men	Men, man, male, human male
Health system	Health system, Health care service response, Health system responsiveness, integrated delivery systems, integrated health care systems

2.2.2 Steps in literature search

The key search terms identified for ‘sexual behaviour’, ‘reproductive behaviour’, HIV, ‘health system’ and their thesauri or synonyms were combined using Boolean connectors (AND, OR and NOT) as appropriate.

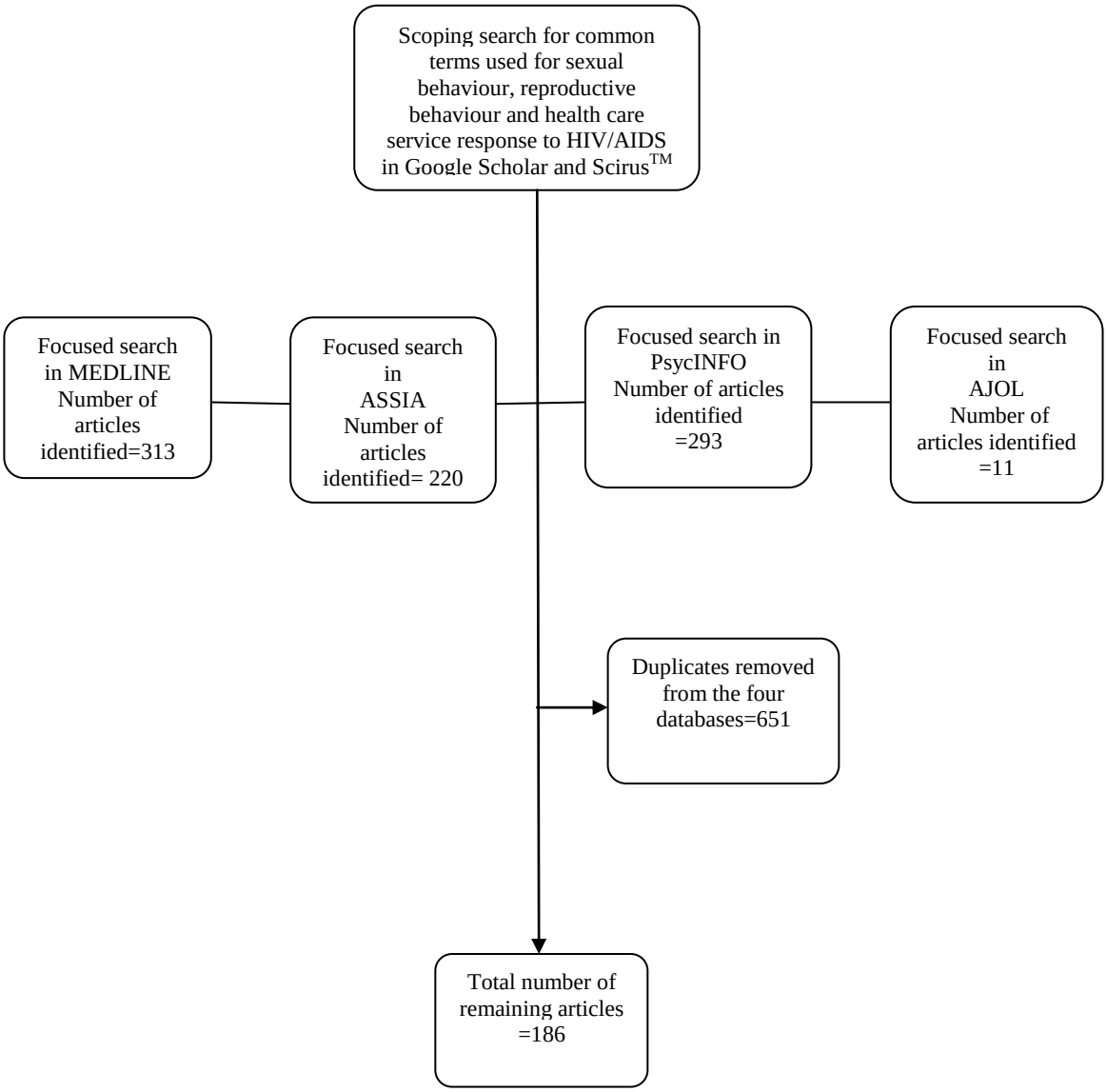
2.2.3 Selecting the databases

After the initial scoping search, a more focused search was conducted in Medline, ASSIA and PsycINFO and African Journals online (AJOL). In Medline, Medical subject Headings (MeSH) terms were used.

The search was refined using three blocks linked with Boolean connectors. Specifically, men, man, couple were linked with ‘OR’ as the first block. The second block included ‘sexual behaviour’, ‘reproductive behaviour’, 'fertility behaviour',‘sexual relationship’, ‘sexual life’ or ‘sexual attitude’ linked by ‘OR’ and the final block included HIV, AIDS and STI also linked by ‘OR’. The search was limited to research articles/reviews, English language publications, initially from 1990 onwards with a second search restricting it to 2004 onwards. The latter period corresponds to the period of increased availability of antiretroviral drugs in developing countries (WHO, 2013). The geographical focus of the search was Africa and articles on ‘men who have sex with men’ were excluded using the ‘NOT’ Boolean connector as they are not the focus of the current research. A separate search was conducted including ‘health system’ together with the earlier blocks to retrieve articles related to the health care service response, which is an important aspect of this work. Retrieved articles were saved in the author’s accounts in Pubmed, PsycINFO, AJOL and ASSIA. They were then exported to Endnote.

The number of articles retrieved from the databases is shown in Figure 2.1.

Figure 2.1 Flowchart of Literature search strategy



After removing duplicates, 186 articles were left. Abstracts and full text articles were screened and relevant ones summarised into thematic clusters. Comments were made regarding their usefulness for the narrative literature review, theoretical framework, methodology and discussions sections as shown in Appendix 10 (p.376).

2.3 Background

2.3.1 Definition of key concepts

Some key concepts and terms used in this thesis need to be defined in order to avoid ambiguity and enhance common understanding. In addition, it will help to standardize measurements especially for the survey component of the study. In addition, it would ease comparison with previous work during discussion.

2.3.2 Sexual and reproductive behaviour

Behaviour has been defined as:

"The range of actions and mannerisms made by organisms in conjunction with their environment, which includes the other systems or organisms around, as well as the physical environment. It is the response of the system or organism to various stimuli or inputs, whether internal or external, conscious or subconscious, overt or covert and voluntary or involuntary" (Dusenbery, 2009, pp. 134-139).

Human sexual behaviour has also been defined as "any activity-solitary, between two persons, or in a group, that induces sexual arousal. There are two major determinants of human sexual behaviour: the inherited sexual response patterns that have evolved as a means of ensuring procreation and the degree of restraint or other types of influences exerted on the individual by dysfunction at individual, couple or societal levels as related to the expression of his sexuality" (Encyclopaedia Britannica incorp., 2013). Furthermore, reproduction is defined as "the process by which a living entity or organism produces a new individual of the same kind." (Kaene & O' Toole, 2003).

The World Health Organization (WHO) defined reproductive health as "a state of complete physical, emotional, mental and social well-being related to the functioning of the reproductive system and not merely the absence of reproductive disease, dysfunction or infirmity" (WHO, 2005). Furthermore, the International Conference on Population programme of action stated that "reproductive health implies that people are able to have a responsible, satisfying and safe sex life and are capable of reproducing and also have the freedom to decide if, when and how often to do so." (UNFPA, 1994).

2.3.3 Sex and Gender

Gender is a "social construct of the roles, activities and behaviour considered appropriate for men and women, while sex on the other hand refers to biological differences between men

and women" (Mane and Aggleton, 2001). Therefore, male and female represent anatomically distinct sex categories, while masculine and feminine refers to the corresponding gender roles. As a social construct, gender confers on men and women different roles, social norms and expectations regarding appropriate conduct in society. These gender norms and ideals significantly affect the sexual and reproductive behaviour of men and women (Varga, 2003). At the individual level, especially, in developing countries, power is shared asymmetrically in favour of men. For instance, in northern Nigeria-the study site-men decide on the number of spouses/sexual partners they wish to have within cultural and religious limits of four, and they determine when and how frequent sexual relations occur. Men may also influence the duration of breast feeding, postpartum abstinence and contraceptive use, including termination of unwanted pregnancies both within and outside marriage (NPC, 2009). This power balance could be modulated by chronic illness such as HIV/AIDS. The direction of influence depends on the perceived source of the infection in the couple, among other factors. This is illustrated by the higher incidence of intimate partner violence experienced by HIV-positive women in the study area relative to their contemporaries in the general population (Iliyasu et al., 2011).

2.3.4 Behaviour change theories

Several theories have been put forward to explain behavior change in public health including HIV-related behaviour (Kalichman and Hospers, 1997). The most commonly used models are the Health Belief Model (Janz and Becker, 1984). In this model, when faced with a health threat, individuals are thought to consider their susceptibility and severity of the threat and their perceived ability to cope (in terms of costs, benefits and barriers). Additional considerations are cues to action. Next is the Theory of Reasoned Action/Planned Behaviour (Ajzen and Madden, 1986), which is centred on intention, attitude, subjective norms and perceived personal control. Another Theory is the Information-Motivation- Behavioural Skills Model, which is similarly based on knowledge, skills, self-efficacy and perceived personal control (Fisher and Fisher, 1992; Fisher et al., 2006). These theories assume a rational analysis of health threats and the perceived capacity to cope.

In the early 1980s, the Transtheoretical Model was developed to explain the steps involved in health behaviour change related to quitting smoking (DiClemente & Prochaska, 1982), weight control (Prochaska & DiClemente, 1985) and psychological therapy (McConnaughy, DiClemente Prochaska, & Velicer, 1989). It describes the stages an individual passes through

when adopting new behaviour or quitting one. Illustrating the steps with the adoption of consistent condom use among HIV-positive men, the process entails:

Pre-contemplation stage: At this stage, the man doesn't intend to use condoms anytime soon.
Contemplation stage: He has been thinking seriously about using condoms during sexual intercourse but is yet to set a commencement date.
Preparation stage (Ready for action): He intends to use condoms consistently with all sexual partners from next month and might already be using it occasionally.
Action stage: He has been using condoms consistently with all sex partners for less than six months.
Maintenance: He has now used condoms consistently with all sex partners for at least six months.

The Transtheoretical model suggests that transiting through these stages involves unique change processes (Prochaska et al., 1992). This has been demonstrated in behaviour change interventions among students (Rossi, 1992), in HIV preventive behaviour and contraceptive uptake (Milstein et al., 1998). The model considers the transition from precontemplation to contemplation stage to be positively influenced by emotional and cognitive processes while subsequent transitions are mainly behavioural. It has been applied in public health to tailor interventions appropriate to the predominant stage at the beginning of intervention programs.

In recent times, the important role of the complex socio-cultural milieu within which sexual and reproductive behaviour occur and the significant impact of the wider structural environment and social institutions (socio-political, legal, gender, economic, health system) has been appreciated (Sweat and Denison, 1995; Crankshaw et al., 2012). Also, there have been suggestions that beyond the explicit processes that are thought to drive behaviour change, there could be implicit, less well understood mechanisms that may even be more powerful (Sheeran et al., 2016). Such implicit processes are thought to be in the cognitive, affective and motivational domains. This was justified by the modest effectiveness of interventions based on existing theories (Sheeran, Harris, & Epton, 2014; Sheeran et al., 2016). Therefore, it appears that the future of research into behaviour change should focus on unraveling the implicit determinants beyond intentions and individual perceived control (Sheeran et al., 2016).

2.3.5 Sexual Behaviour

Sexual activity and high risk behaviour

Aspects of sexual behaviour that enhance the transmission of HIV virus include the number and types of partners, HIV status of sexual partner(s), consistent condom use and coital frequency. "Sexually active" is defined as those who report at least one penetrative vaginal intercourse in the preceding 6 months (Venkatesh, 2012). Coital frequency refers to the weekly total episodes of self-reported sexual intercourse. Condom use was classified as 'never', 'occasional' or 'always' in the last 6 months while unprotected sex refers to condomless sex over the same period. Those reporting more than one sexual partner in the last 6 months were considered to have multiple sex partners (Venkatesh, 2012). These dimensions of HIV-positive men's sexual behaviour have not been adequately documented in northern Nigeria during the era of increased access to ART.

2.3.6 Fertility desires/ intentions and HIV/AIDS

When applied to fertility, desires and intentions are considered different constructs. Fertility desires are emotional goals, wishes or ideals that may or may not be realised while fertility intention takes desire a step further by demonstrating plans for action denoting a commitment to realising such desires in a stated period. Therefore, in addition to the desire, intention involves concrete plans for the achievement of the reproductive goals in the short-term, usually within three years (Kodzi, Johnson & Casterline, 2010; Chen et al., 2001). Fertility intentions are likely to be influenced by individual circumstances, family situation and structural factors. Questions such as 'Do you wish to have any/more children?' assess wishes or ideals and are therefore related to reproductive or fertility desires. If the concrete plan to achieve such desires in the short-term is inquired using questions such as 'Do you intend to have a child within the next three years?' then one is exploring commitment which refers to the reproductive or fertility intention (Wagner and Wanyenze, 2013).

Miller described the psychological sequence of Traits-Desires-Intentions-Behaviour which results in reproductive behaviour outcomes (Miller, 1994). It describes how innate and acquired motivations for procreation led to fertility desires, intentions and childbearing on a continuum. The first step in the sequence of events leading to childbearing is the formation of a series of internal tensions which motivate the individual to respond in certain ways under a given circumstance. These motivations are then activated into parenthood desires, which are

in turn transformed into conscious commitment to act to bear children (i.e. fertility intentions). When a favourable condition exists (willing spouse, fecundity, health status etc.) this culminates in childbearing (Miller, 1994).

Although studies have reported an association between desires, intentions and fertility outcome (Miller, Severy & Pasta, 2004; Ajzen, 1991), rarely do they collect separate information regarding desires and intentions as a result of the difficulty of distinguishing between these terms in local languages (Kodzi, Johnson & Casterline, 2010). This lack of clarity has meant the terms desire and intention are used interchangeably in some demographic literature. For instance, the Demographic and Health Survey tools elicit fertility intention by asking women whether they want more children. By the previous definition, this is simply a desire. Similarly, the National Surveys of Family Growth in the United States use this method. In contrast, however, the Generations and Gender Surveys in Europe inquire separately about desire and intention (Hayford and Agadjanian, 2012) as in this study.

The assessment of fertility desires, intentions and its ability to predict fertility behaviour is important for population policy and family planning programs. Evidence from studies in developed countries and developing countries in Asia shows that desires and intentions modulate fertility behaviour even after adjusting for socio-demographic confounders. Although reproductive desires of HIV-positive women in sub-Saharan Africa has been extensively investigated (Myer et al., 2010; Asfaw et al., 2014), same cannot be said about the fertility desires and intentions of HIV-positive men during the ART era (Hayford and Agadjanian, 2012). It is also not known how these men's reproductive behaviour compare with their HIV-negative or untested contemporaries. Specifically, despite men's critical role in reproductive and other family decisions, no such studies have been conducted among HIV-positive men in Kano, northern Nigeria. This is one of the voids that this thesis seeks to fill.

2.3.7 Health care service response

The way a society re-organizes its health care services to address the specific needs of HIV-positive people affects the effective delivery of services to improve, maintain or restore health of its members (GNP+, ICW, Young positives, EngenderHealth, IPPF, UNAIDS, 2009). Specifically, WHO defined health system, of which health services are a component of, in terms of how people and institutions are organized to prevent and treat diseases, together with the supporting health policy, human resources, finance and supply systems,

health services and information management systems (WHO, 2005). In addition to these, promotion of healthy living and creation of demand are important aspects. The way these resources are organized varies worldwide. Even during the pre-HIV era, health service providers in most developing countries struggled with the huge burden of endemic communicable diseases, maternal conditions and childhood diseases. Therefore, the HIV/AIDS epidemic has saddled these overwhelmed providers with additional responsibility of providing counselling and testing services, antiretroviral drugs, anti-tuberculosis treatment, prophylaxis for other opportunistic infections and other supportive treatment. They also provided prevention of mother to child transmission services.

The organization of health care services influence availability and access to services for people living with HIV/AIDS. In developing countries, the public sector providers have been emphasized despite the important roles that the private sector plays in health care delivery. The private not-for-profit organizations have also played key roles in the provision of HIV/AIDS services in these countries including sexual and reproductive health services (O'Malley, 2007). However, the response of these services to the sexual and reproductive health needs of PLWHA has not been well explored in most developing countries including northern Nigeria.

Using the WHO framework, inadequacies could occur at several of the six component levels of the health system (See Figure 2.2) (WHO, 2009). However, the focus of this study is on health care service provider perspectives rather than the whole health system which is beyond the scope of this work. The important role of the health care workers is dependent not only on their knowledge and skills but also their attitude towards conception among HIV-positive couples. Furthermore, availability of equipment and supplies also constitute barriers for provision of SRH services as part of a comprehensive health care package for PLWHAs (WHO, 2009). Despite men's pivotal role in the spread of the infection and their influences on reproductive decisions, efforts at rectifying these weaknesses have rarely included them.

Figure 2.2 Structure of the health system

Source: WHO (2009). Everybody's business: strengthening the health systems to improve health outcomes. WHO's framework for action. Geneva: World Health Organization.

2.4 Sexual and reproductive behaviour of HIV positive men

2.4.1 Sexual behaviour of HIV-positive men

Little attention was paid to the sexual and reproductive behaviour of HIV-positive men in the early phase of the HIV/AIDS epidemic except for high-risk sexual behaviour (Kennedy et al., 2007). This may not be unconnected with the poor prognosis of the disease and its earlier perception as a death sentence (Schiltz and Sandfort, 2000). The focus of interventions was therefore, expectedly, on prolonging life and palliative care. Few investigations were conducted into HIV positive men's reproductive behaviour in particular. These occurred mostly in the US and other developed countries focusing mostly on men having sex with men (Aidala et al., 2006). Meanwhile, investigations into the sexual behaviour of HIV-positive men in sub-Saharan Africa concentrated on risky sexual behaviour and condom use, with little elucidation of the influence of men's HIV status on sexual activity and fertility behaviour.

Reports indicate that some people abstained from sex completely after receiving the results of a positive HIV diagnosis for reasons ranging from the desire to protect their spouses, partner's ill health, abandonment or death. Other reasons include ill health and fear of getting infected with a resistant strain of the virus (Gruskin, Ferguson & O'Malley, 2007). The discovery of effective combination ART enhanced men's quality of life and longevity. Given that the majority of infected men were within the reproductive age group, this drew the attention of researchers to the interaction between self-awareness of HIV-positive status, sexual activity and reproduction. Still, ART drug availability lagged behind in these resource-limited countries. This also meant studies evaluating the effects of improved HIV management on sexual and reproductive behaviour were mainly conducted in the developed countries (Kennedy et al., 2007; Luchters et al., 2008). It was only later that ART drugs became widely available in developing countries (Delvaux and Nöstlinger, 2007; Sarna et al., 2009).

Reports from developed countries indicate that HIV-positive persons engaged in sexual activity following improved health status as a result of ART treatment (Kennedy et al., 2007; Luchters et al., 2008). The prevalence of sexual activity was as high as 70% in some studies (Crepaz and Marks, 2002; Niccolai et al., 2009). The few reports from sub-Saharan Africa indicated some level of sexual activity among HIV-positive people (Sarna et al., 2009; Allen

et al., 2011). For instance, studies in Uganda reported that 42% to 60% of PLWHAs were sexually active (King et al., 2011; Tumukunde et al., 2010). The corresponding figures in Mozambique (48% to 64%) were similar. These studies also reported an inhibitory influence of HIV-positive status on libido, sexual drive, desire and satisfaction, resulting in diminished sexual frequency or abstinence. Study participants attributed it to emotional distress, fear, worries about horizontal transmission to uninfected partners and re-infection with a new strain (Keegan et al., 2005; Siegel, Schrimshaw & Lekas, 2006; Rispel et al., 2011).

The risk of transmission to sexual partners and re-infection with new and resistant strains of the virus led to more attention to the study of sexual behaviour of PLWHA. The literature on the effect of ART on sexual behaviour has been varied. While earlier studies in the developed countries mainly among men who had sex with men showed an increase in risky behaviour among PLWHA on ART (Olley 2008; Katz et al., 2002), systematic reviews did not show any such evidence (Kennedy et al. 2007; Crepaz, Marks and Hart, 2004). In fact, reports from some African countries indicate a risk reduction among patients on ART (Eisele et al., 2009; Luchters et al., 2008; Pearson et al., 2011).

It appears that the counselling received on safer sex practices during ART clinic visits partly account for this decrease in sub-Saharan Africa. The increased risk taking elsewhere may be due to the phenomenon of disinhibition or treatment optimism among PLWHA while on ART. They feel that the drugs make them non-infectious; especially if they have undetectable viral levels leading to a false sense of security (Kennedy et al., 2007; Kerrigan et al., 2006). A recent review showed that overall, ART doesn't increase risky sexual behaviour among PLWHA (Berhan and Berhan, 2013). The lack of disaggregation of the review by sex made it difficult to ascertain whether these effects are the same among women and men. This is important particularly in specific cultural milieu where there are imbalances in decision-making power and gender roles as seen in northern Nigeria. In this study area, a report showed that the proportion of sexually active PLWHAs (both men and women) ranged from 41.5% to 70.6% before the widespread availability of ART (Iliyasu et al., 2009). However, there are no specific studies focusing on men's sexual behaviour in this region during the ART era. This study seeks to address this gap.

2.4.2 High risk sexual behaviour among HIV- positive men

High risk sexual behaviour such as multiple sexual partners within or outside marriage and condomless sex are potent drivers of the epidemic. Studies of men in sub-Saharan Africa have focused on these behaviours mainly in order to develop strategies for risk reduction. A metaanalysis conducted in the early phase of the epidemic found that following VCT, a higher proportion of PLWHAs avoided risky sexual encounters and adopted consistent condom use (Weinhardt et al., 1999).

Mixed results have been seen in sub-Saharan Africa. For instance, in Zambia, following VCT, condom use increased from 3% to 80% among discordant couples (Allen et al., 2003), while 35% of PLWHAs in Uganda engaged in high risk sex. Of those that were sexually active, 19% never used condoms while 40% used condoms inconsistently (Tumukunde et al., 2010). In contrast, another Ugandan study found a 70% sexual risk reduction after 6 months of ART, and most (85%) of those who did not change wanted to have babies (Bunnell et al., 2006). Similarly, over a third (36.9%) of Ethiopian couples who avoided using condoms blamed it on partner's objection, sero-concordance and the desire to conceive (Dessie et al., 2011). In South Africa, results were also varied. While some studies reported a low reduction in rates of unprotected sex among PLWHAs (16%) (Kalichman et al., 2010), others found a substantial (60%) reduction (Venkatesh et al., 2012). Another South African study reported a reduction from 44.7% to 23.2% following ART (Eisele et al., 2009). In contrast, a study in Mozambique reported that the proportion of PLWHAs with HIV-negative or partners of unknown status increased from 45% to 80% after a year of ART treatment (Pearson et al., 2011).

The only report from Kano was before the widespread availability of ART (Iliyasu et al., 2009). The increased number of patients on long term ART treatment now provides an opportunity to investigate the effects of HIV status and its treatment on men’s sexual and reproductive behaviour in this setting. This is important because of the enormous influence that men have in all spheres of family life, including the initiation, timing, frequency and safety of sexual relations. This could provide information for engaging these important stakeholders in prevention. Enhancing understanding of men’s sexual and reproductive behaviour may hold the key to a safer and more satisfying sex life while achieving desired fertility at minimal risk. The existing literature on the latter is now examined.

2.4.3 Reproductive behaviour of HIV- positive men

Apart from factors that influence reproductive behaviour among the general populace, PLWHA face additional difficulties and tough choices when making reproductive decisions. During the early phase of the epidemic, strong pressure from the community and health care providers discouraged them from contemplating parenthood. This was premised on the risk of vertical transmission and concerns about the welfare of orphans. Other reasons include the risk of infecting discordant sexual partners or re-infecting concordant ones with new strains. These challenges notwithstanding, reports indicate that HIV-positive people still desire parenthood for many reasons (Nattabi et al., 2009). This was especially evident in developing countries due to the cultural importance attached to childbearing and its central role in maintaining social identity and lineage. In order to be accepted as 'normal', couples need to reproduce. Failure to do so accentuates the stigma already associated with the disease. Reports indicate that this may be the single most important reason why some couples venture into childbearing (Nattabi et al., 2012). Furthermore, majority of research reports from both developed and developing countries suggest that HIV status influence reproductive desires in a variety of ways (Boonstra, 2006).

Different risk reduction strategies have evolved to assist HIV serodiscordant couples to achieve pregnancy at minimal risk. These include: artificial insemination, sperm washing (Mathews et al., 2010), pre-exposure prophylaxis (PrEP) for the HIV negative partner (Baeten et al., 2012) and antiretroviral therapy (ART) for the HIV-positive partner (Cohen and Gay, 2010). Others are unprotected sex during peak fertility (Vernazza et al., 2011) and medical circumcision of the uninfected male partner (Bailey et al., 2007). It is however, uncertain if HIV-positive men in northern Nigeria are aware of these options and whether or not the health care service avails them of this opportunity.

The attitude of health care workers towards the reproductive rights of PLWHA in developing countries is also suspect (Oladapo et al., 2005). Some health workers maintain that PLWHAs should concentrate on survival rather than engage in procreation. They view reproduction as essentially a function of the 'healthy' in the population. In addition, the busy and bustling activities at the ART clinic and lack of privacy inhibit discussions about sex and reproduction. Even in centres that provide limited SRH counselling and referral, men are rarely the focus. This neglect and 'reverse gender discrimination' starts even earlier, where women have ample opportunity of knowing their HIV status during antenatal care as part of

PMTCT programmes. It was earlier reported from the study site that a few men get to know their status during pre-marital screening, following spouse's positive HIV test, or when donating blood (Iliyasu et al., 2011).

Couples constitute the reproductive unit. However, they may not always agree on a common reproductive agenda, especially, in polygamous settings where inherent competition between co-wives makes reproductive decisions more complex (Bove & Valeggia, 2009). Some studies report greater desire for children among HIV-positive men compared to their partners (Nakayiwa et al., 2006; Yeatman, 2009; Cooper, Harries & Myer, 2007). Despite inherent risks and challenges, many PLWHAs still choose to procreate, whether in sero-concordant or discordant relationships (Sherr & Barry, 2004). The main reasons for this include securing relationships, continuity of lineage and immense cultural pressure. Reported challenges among PLWHAs in developing countries include: fear of HIV transmission to partner and child, lack of skills and unequal power and negotiation skills between spouses and unavailability or poor access to safe conception methods (Beyeza-Kashesya et al., 2010). A recent metaanalysis showed an increasing desire to procreate among HIV-positive people (Berhan and Berhan, 2013).

In Sub-Saharan Africa reports show that a substantial proportion of PLWHAs want to bear children (Mantell, Smit & Stein, 2009). This is illustrated by findings among PLWHAs in Tanzania, where over a third (37.1%) of respondents wanted to have an average of 2.4 children (Mmbaga et al., 2013). Similarly, more than half (59%) of mutually disclosed discordant couples in Greater Kampala wanted children (Beyeza-Kashesya et al., 2010). In another study in Uganda, 70% of PLWHAs opined that HIV infection doesn't preclude childbearing and 30% wanted to have them. One tenth of female respondents had been pregnant following diagnosis, while partners of 17% of men had conceived (Tumukunde et al., 2010). In the same country, PLWHAs were 6.25 times less likely to desire child bearing compared to others (Heys et al., 2009). In rural Uganda, a comparative study between PLWHA on ART and controls found that 13.6% of all participants wanted to have children but, those on ART were more likely to desire parenthood (Kipp et al., 2011). In another study among HIV clients in Uganda, 44% wanted to conceive in the near future (Wagner and Wanyenze, 2013). Furthermore, in a study conducted among monogamous couples in northern Malawi, 73% of HIV-positive men and 83% of HIV-positive women showed no interest in future child bearing. This is much higher than the corresponding figures of 35%

and 38% among controls. Further, there was a higher likelihood (OR=11.5) of HIV sero-concordant couples to want to cease parenting compared to their HIV negative counterparts. However, this did not translate into substantial difference in uptake of contraception (Dube et al., 2012). In South Africa, a comparatively higher proportion of HIV-positive men (57%) and women (45%) intended having children (Cooper, Harries & Myer, 2007). A report from the study area during the early phase of the epidemic also indicated that much higher proportions of HIV positive men (61.2%) and women (65.5%) were desirous of having children (Iliyasu et al., 2009). It is uncertain if this has been altered following increased access to ARTs. Furthermore, the proportion planning to realise their fertility intention in the short term is unknown. Fertility intentions have consistently predicted future fertility (Lewis et al., 2004; Kodzi, Johnson & Casterline, 2010) and contraceptive use (Casterline and Sinding, 2000) in several studies.

Men's roles in reproductive decision-making when one of the partners had HIV infection, their awareness and practice of safe sex and conception and the factors that modulate their reproductive decisions have not been fully investigated in northern Nigeria. The availability of ARTs, culturally determined gender relations, high premium on fatherhood and the practice of polygamy could all present unique challenges to men in this setting when making sexual and reproductive choices. An exploration of how men negotiate this maze at individual, couple, household and societal levels within the context of HIV and its treatment is yet to be documented in northern Nigeria.

From the foregoing, there is evidence that some PLWHAs are desirous of parenthood. However, there is limited research on the desire for fatherhood, knowledge and uptake of safe conception and risk reduction measures, and the response of the health care service to such desires among HIV-positive men in northern Nigeria.

2.5 Factors associated with sexual behaviour of HIV- positive men

Studies in sub-Saharan Africa identified several factors influencing sexual activity and risk taking among PLWHAs. For instance, in Uganda, the likelihood of sexual activity among HIV-positive adults was higher if the respondent had a partner whether married or co-habiting and if they had better physical health (Negin et al., 2016).

Regarding risky sexual behaviour, a recent multi-country study identified younger age, being male, years of education, substance use and perceived low efficacy as predictors of inconsistent condom use (Sullivan et al., 2016). Similarly, a study in South Africa found that, treatment-related beliefs had significant effects on unprotected intercourse among PLWHAs (Kalichman, Simbayi & Cain, 2009). Other risk factors include improved health status, non-regular or casual sex partners and rural residence. Furthermore, some researchers identified older age, use of alcohol and drugs in sexual context as risk factors for unprotected sex in the same setting (Kalichman et al., 2010; Peltzer and Ramlagan, 2010).

There have also been consistent reports of significant risk reduction among PLWHAs following ART treatment (Eisele et al., 2009; Berhan et al., 2008; Venkatesh et al., 2012). In contrast, non-adherence to ART and the erroneous beliefs that undetectable viral load level eliminates infectiousness were reportedly associated with risky sexual behaviour (Kalichman et al., 2010; Peltzer and Ramlagan, 2010). A study in South Africa reported increased risk of condomless sex with being male, lower educational attainment, higher CD4 cell counts and higher perceived stigma (Peltzer and Ramlagan, 2010). Other correlates of risky sex among HIV-positive men receiving ART in the same country were inadequate knowledge, symptoms of depression and negative attitude towards condoms (Shuper et al., 2014).

A study in Mozambique found that men enrolled on ART were more likely to engage in condomless sex if they had not disclosed their status to the partner (Pearson et al., 2011). However, in Ethiopia, non-communication about barrier methods, low self-efficacy and perceived decrease in sexual pleasure with condom use were identified as risk factors for unprotected sex. In contrast, having an untested partner or one who is sero-negative was associated with lower risk behaviour (Dessie et al., 2011). In Uganda, wanting to have children strongly predicted high risk sex among PLWHA (Tumukunde et al., 2010). Another Ugandan study showed that pre-existing sexual risk behaviour, physical health, cultural context and structural factors greatly influenced current couple relationships, including sex (King et al., 2011). Cultural context include gender power relations and societal tolerance to concurrent and serial multiple sexual partnerships. The potential of leveraging interventions at the structural level to reduce sexual risk and gendered power differential among PLWHA was recently reported in a study in rural Kenya (Zakaras et al., 2016).

2.6 Factors associated with reproductive behaviour of HIV- positive men

Studies have indicated that reproductive choices among PLWHAs are influenced by a variety of factors. For instance, a systematic review reported that fertility desires among PLWHA was predicted by sex, age, marital status, perceived health and felt stigma. In addition, the socio-cultural context also strongly modulated fertility. The researchers recommended including socio-cultural variables in future conceptual models of studies investigating fertility desires among PLWHAs. The authors argued that it would provide a holistic understanding for the development of context specific reproductive information and services for PLWHAs (Nattabi et al., 2009). These factors were included in the framework (Crankshaw et al., 2012) that was adapted for the current study.

In South Africa, recent ART initiation was associated with higher fertility intention but this was not the case with CD4 cell counts (Schwartz et al., 2012). Another study in the same setting reported greater fertility intention among men who had smaller family size, lived in temporary accommodation and were currently enrolled in ART programs (Cooper et al., 2009).

A study conducted in Uganda found that being of a particular ethnic group (Mutooro) (OR 3.20), being female (OR 2.42), having many living children (OR 1.62) and older age (OR 1.13) were significant deterrents to childbearing among PLWHAs. Despite this, only 3.5% and 0.4% of HIV-positive and HIV-negative respondents, respectively, used dual protection. The unmet need for family planning was higher among HIV-positive respondents compared to those who were negative (90% vs. 78%) (Heys et al., 2009). In the same country, a partner's desire for children was a major determinant of the respondent's reproductive outlook, irrespective of HIV status. Specifically, in serodiscordant couples where the woman was HIV-positive, increased fertility desire was associated with younger age and pressure from extended family members. On the other hand, if it is the man that is seropositive, being aware of the effectiveness of ART influenced fertility desire positively. In contrast, the availability of information on contraception was associated with decreased fertility desire (Beyeza-Kashesya et al., 2010). Another study from Uganda observed that younger age of the patient and their partner, better physical health and higher internalized stigma were associated with fertility intentions (Wagner and Wanyenze, 2013).

A recent study in Tanzania also identified significant association between fertility desires and living and having sex with a partner, HIV disclosure, good perceived health status and CD4

count ≥200 cells/mL for both sexes. In contrast, reduced reproductive desire was associated with having more than two children among females, divorce or separation, and having a child with the current partner among both males and females. Furthermore, fertility desire and intention of PLWHA was substantially high, though lower than that of the general population in the country (Mmbaga et al., 2013). The factors reportedly associated with fertility desires are now categorised into socio-demographic, cultural, disclosure, contraception and ART use.

2.6.1 Socio-demographic factors, fertility desire and HIV

The socio-demographic factors that seem to modulate fertility desire among PLWHAs include respondent's sex, age and number of living children. Studies have found that compared to women, HIV positive men were more desirous of future children (Yeatman, 2009; Cooper et al., 2009). However, this wasn't the case in an earlier study in northern Nigeria (Iliyasu et al., 2009).This could be due to the intense social pressure on women to prove their fertility. Furthermore, younger PLWHAs were more likely to desire parenthood compared to their older counterparts (Oladapo et al., 2005; Nakayiwa et al., 2006; Myer, Morroni & Rebe, 2007; Kipp et al., 2011). The number of living children has been a consistent determinant of fertility desire among HIV infected and non-infected people alike. An inverse relationship was reported between the number of living children and fertility desire in several studies (Nakayiwa et al., 2006; Myer, Morroni & Rebe, 2007; Heys et al., 2009; Kaida et al., 2011), including a previous study in northern Nigeria (Iliyasu et al., 2009). Subjective health status is another important predictor of fertility desire, where those who felt healthier tend to favour childbearing compared to sick persons (Chen et al., 2001; Smith and Mbakwem, 2007).

2.6.2 Socio-cultural factors, fertility desire and HIV

Socio-cultural factors have been identified to have a strong influence on fertility desire among the general populace and those infected with HIV. In sub-Saharan Africa, fatherhood is greatly valued and a high cultural premium is placed on biological children (Caldwell and Caldwell, 1987; Isiugo-Abanihe, 1994). Larger family sizes place men on a higher social pedestal and provide the desired agricultural workforce in these mainly agrarian settings (Isiugo-Abanihe, 1994). In addition, children are considered an effective social insurance for the elderly (Cooper, Harries & Myer, 2007), especially where formal social security systems are non-existent or precarious as in most of sub-Saharan Africa. For the HIV infected,

reproduction may be the evidence required for social rejuvenation and restoration of self pride, dignity and normalization (Smith and Mbakwem, 2010).

2.6.3 Disclosure of HIV status and fertility desire

The disclosure of HIV status to the partner may encourage more open discussions about reproductive prospects and safer conception options. Disclosure is in turn facilitated by low self-stigma. It is in turn more likely that partners who have self-disclosed would seek for support from the health care service related to risk reduction, safe conception or contraception as the case may be (Wagner and Wanyenze, 2013). Researchers have also reported that some HIV infected persons may be motivated to have children in order to conceal their HIV status and thus be considered normal (Smith and Mbakwem, 2010; Cooper, Harries & Myer, 2007). There may also be HIV infected persons who may not desire to have children regardless of societal pressure and subjective health feeling (Delvaux and Nöstlinger, 2007). However, such people may struggle to maintain this stance without adequate contraceptive support from the health care service.

2.6.4 Fertility desire, contraceptive uptake and HIV

PLWHAs who want to have children are unlikely to use contraception and vice versa. However, studies indicate that this may not necessarily be so (Rutenberg and Baek, 2005). As there are HIV-positive couples who do not use any contraception despite not wishing to conceive. Studies have found diverse levels of contraceptive uptake among PLWHAs. While a few studies showed a higher contraceptive prevalence (Johnson et al., 2009; Elul et al., 2009; Delvaux and Nöstlinger, 2007), others report no such difference in contraceptive use by HIV status (Rutenberg and Baek, 2005). Apart from self-motivation, health care service factors influence access and utilization of these services.

2.6.5 ART, fertility desires and intentions among PLWHA

The improvement in quality of life of PLWHAs following combined ART treatment was expected to affect reproductive desire positively. However, a mixed picture has been reported in the literature (Myer, Morroni & Rebe, 2007; Cooper et al., 2009; Maier et al., 2009). While some workers report no significant association between ART use and fertility desire (Kaida et al., 2011; Homsy et al., 2009; Kipp et al., 2011; Kakaire, Osinde & Kaye, 2010), others (Maier et al., 2009) reported an increase in fertility desire with use of ART but not pregnancies or live births as observed in rural Uganda (Maier et al., 2009). The translation of

fertility desire into deliberate efforts leading to achievement of safe pregnancy and delivery requires strong self-motivation, understanding of the partner and support from the health care service (Smith et al., 2012). PLWHAs living in developing countries including northern Nigeria may not have such opportunities thereby hindering the realization of their reproductive dreams. This study intends to explore beyond HIV-positive men's fertility desire in northern Nigeria. The concrete steps they take, their perception of the risks involved, knowledge of safe conception and risk reduction measures would be assessed together with the support or barriers posed by the health care service. The improvement in quality of life, perceived ability to cater for these children and the desire to be accepted by society could explain the renewed desire to bear children. On the other hand uncertainty about sustainability of ART drugs and the stress of child care could serve as deterrents.

2.7 Men's perception of the effects of HIV status on their sexual behaviour

A study in the US showed that HIV-positive men were making tough choices regarding who to have sexual relationships with. While some men adopted abstinence, others were very selective and became sexually close only where the relationship was heading somewhere. They had hard times with selecting who to trust and disclose their serostatus to, sexual lifestyles to adopt and type of partners to select (Relf et al., 2009). PLWHAs in Tanzania also lamented the profound changes brought to their lives by their HIV status. They had to learn new ways of having sex and men in particular changed their perceptions and ways from the sexually adventurous 'macho' man to being in a faithful relationship with a carefully selected partner (Balaile et al., 2008).

A study conducted in Uganda reported that HIV discordant couples identified sexual negotiations as their most formidable challenge. Couples adopted abstinence, consistent condom use, bed separation, outsourcing to sexual partners outside wedlock and divorce (Bunnell et al., 2005). In the same country, PLWHAs reported changes in sexual desire following ART treatment. Reasons for abstinence included fear of super-infection or sexual transmission to others, and misconceptions that sex would reactivate the dormant virus leading to deterioration in their health (Wamoyi et al., 2011). Others were just obeying the advice of their counsellors. Couples were motivated to resume sexual activities as a marital duty, to satisfy their sexual desire, for partner's economic support, to maintain companionship and to have children (Wamoyi et al., 2011). Sero-discordant couples confessed that the situation destabilized the family with the sero-negative partner often

reacting angrily and accusing the other of marital infidelity. The couples become pre-occupied with salvaging the marriage, protecting the uninfected partner, in the face of daunting challenges of survival, stigma and societal expectations. Strategies adopted following the initial shock include abstinence, condom use and pre-exposure prophylaxis (PrEP) for the uninfected partner (Chirwa et al., 2011). No similar studies have been reported from northern Nigeria. One of the objectives of the planned study is to address this knowledge gap by providing an opportunity for HIV-positive men in northern Nigeria to describe how their HIV status and ART have affected their sexual lives and reproductive plans.

2.8 Men's perception of the effects of HIV status on their reproductive behaviour

The perceptions of PLWHAs on the effect of HIV status on men's reproductive behaviour are varied. For instance, in South Africa HIV-positive status modified but did not eliminate reproductive desires (Cooper, Harries & Myer, 2007). There was also a diversity of reproductive intentions ranging from low to high with some PLWHAs wishing to avoid parenthood all together. They cited fears of horizontal and vertical transmission as important deterrents. They also perceived a strong community disapproval of their involvement in reproduction. Paradoxically, they are not exempted from the prevailing socio-cultural norms regarding the importance of having children. For women, the pressure to bear children from family and society sometimes counterbalances the risk of HIV infection as a deterrent for reproduction. The evolution of ART and PMTCT programmes may have altered the desires of HIV-positive men and women in favour of childbearing (Cooper, Harries & Myer, 2007). In another study in the same setting, PLWHAs with sero-discordant partners expressed strong desires for having children, but were mostly ignorant of safe conception methods. Only a few of them planned their pregnancies. Misconceptions about sero-discordance and strong desire for fatherhood predisposed them to risky sexual behaviour. Participants also expressed readiness to adopt effective safe conception and risk reduction strategies when made available (Matthews et al., 2013).

A study among PLWHAs in Malawi observed that some of them remarried after the death of a spouse. Their marital partners include HIV-positive and HIV-negative people and some of them had children (Gombachika et al., 2013). In Ethiopia, couples diagnosed HIV-positive were initially in shock and denial followed by a transition to reality where they struggled to

maintain the relationship. They were then faced with the challenges of safe and satisfying sex life and reconciling differences in reproductive desire over time (Hailemariam et al., 2012). Among PLWHAs in Uganda, there were divergent views as to the true meaning of sero-discordance. While some believed that a negative HIV test for a partner truly reflects absence of the infection, others maintained that individuals with such results may still be harbouring the virus (King et al., 2011).

A study conducted in South East Nigeria discovered that HIV-positive people engaged in marital contract and parenthood to normalise and avoid the stigma related with the infection. PLWHAs also reported a strong influence of culture and societal expectations on their sexual and reproductive behaviour, sometimes far above medical or public health considerations (Smith et al., 2004). The effect of HIV infection on marriage and lives of women in northern Nigerian culture has also been recently described (Rhine, 2009). The author underscored the importance of support groups to HIV-positive women beyond treatment adherence to economic empowerment, self-worth and marital match-making. This unique role of support groups addresses the sexual and reproductive needs of PLWHAs and empowers them to regain self-esteem and confidence. Despite their eminent decision-making role, no study has focused on the influences of HIV-positive status on the relationship, marriage, sexual and reproductive lives of HIV-positive men in northern Nigeria. This study intends to fill this gap.

2.9 Health seeking behaviour, access and utilization of sexual and reproductive health services among HIV- positive men

2.9.1 Contraceptive uptake among HIV-positive men and their partners

Although there are concerns about interactions between ART drugs, antituberculous drugs and hormonal contraceptives (Delvaux and Nöstlinger, 2007), WHO considers hormonal contraceptives safe, except for the additional need for condom use in women who choose the injectable progestin only method (Kosgei et al., 2011). Information and access to these methods (including permanent methods) among PLWHAs who have completed their family sizes is still limited in developing countries, where they are most needed. Due to reproductive desires and socio-cultural factors, uptake of condoms in long term-relationships has remained a major challenge (Delvaux and Nöstlinger, 2007). Contraceptive prevalence among PLWHAs in different settings is now explored.

A study in Zimbabwe reported significant differences in the prevalence of all types of contraception by HIV status. Specifically, 22% of HIV-positive women were not using any

form of contraception compared to 14% among those that were HIV-negative. Also, more than half of HIV-positive couples reported using condoms compared to 13% of their HIV-negative counterparts. Furthermore, an equal proportion (13%) of HIV-positive women expressed desire for having children. More than 60% of the respondents did not know their sexual partner's HIV status, while a quarter of those that were infected had not disclosed their sero-status to their sexual partners (Kurewa et al., 2011). Another transnational study conducted in Zimbabwe and South Africa reported that approximately 9% of women were using the diaphragm covertly. This method concealment ranged from complete covert use to full disclosure and may not be unrelated to differences in reproductive desire between couples (Sahin-Hodoglugil et al., 2009).

Regarding condom use, a significantly higher proportion of condom use was reported among men and women who had VCT in Mozambique. However, this was not the case among those that did not undergo VCT (Mola et al., 2006). In contrast, men in Kenya were reluctant to use condoms regardless of HIV status. This was attributed to poor self-efficacy and lack of negotiation skills. Other reasons were false beliefs about sero-discordance and the desire for more children (Ngure et al., 2011). Surprisingly another study in the same country reported a remarkable rise in condom use among couples from 5% to 77.7% following determination of HIV sero-status (Benki-Nugent et al., 2011).

2.9.2 Access to safe conception methods

Despite the increased risk of acquiring new infections among HIV sero-discordant partners, they have attracted little or no attention from programmes, especially in resource-poor settings where they are also in large numbers (Desgrées-du-Loû & Orne- Gliemann, 2008). The main challenge faced by these couples is in protecting the uninfected partner and their unborn children (Thornton, Romanelli & Collins, 2004). Many strategies have evolved over time to enable PLWHAs to procreate safely. For the sero-discordant couple in which the man is HIV-positive, sperm washing has become the method of choice complemented by in-vitro-fertilization (IVF) (Matthews et al., 2010). This entails isolation of spermatozoa from semen devoid of infected seminal plasma or leukocytes. The process also tests for residual contaminants before using the sperm isolate for IVF. If it is the woman who is HIV-positive, self-insemination at peak ovulatory period is the preferred technique (Matthews et al., 2010). A combination of vaginal insemination at peak fertility period and consistent condom use is the safest recommended method in resource poor settings (Mmeje et al., 2012). However,

PLWHAs in these settings may be unaware of these interventions and the services may not even exist.

There is also evidence that pre-exposure prophylaxis (PrEP) with antiretroviral drugs is effective in reducing the risk of transmission (Savasi et al., 2013). Other precautionary measures include appropriate timing of pregnancy to minimise the risk of drug-induced toxicity for the conceptus, while reducing vertical transmission rate to a minimum (Matthews et al., 2010). Elective Caesarean section is the mode of delivery of choice and breastfeeding was contraindicated (Boer et al., 2010). However, access to the safer conception methods outlined earlier are severely restricted in resource-limited settings (Delvaux and Nöstlinger, 2007; Bell et al, 2007; Gruskin, Ferguson & O'Malley, 2007; Chadwick et al., 2011) and the WHO now recommends exclusive breastfeeding for HIV-positive mothers (WHO, 2010). Furthermore, despite growing evidence of the effectiveness of male circumcision in reducing new male HIV infections (Mills et al., 2008), the procedure is rarely offered for this purpose in many developing countries, even where circumcision is a cultural norm (Iliyasu et al., 2013). The response of the health care service to the changing needs of PLWHAs in Nigeria is now reviewed.

2.9.3 HIV/AIDS Policy and integration of SRH services in Nigeria

Efforts at integrating HIV/AIDS and SRH programs have faced several challenges. These include resistance to change among specialist health care workers delivering the two services, stigma and lack of capacity and skills, especially as related to HIV care, sexuality and working with disadvantaged groups. Most importantly, HIV/AIDS programmes are hesitant to share their financial resources with SRH services (Sai, 2005).

Nigeria has developed and revised the national policy on HIV/AIDS in line with global best practices and advances in HIV/AIDS prevention and management (FMOH, 2010a). Similarly a national SRH policy was developed based on the ICPD program of action and its subsequent updates. Furthermore, effort at integrating SRH and HIV services in Nigeria has been championed by donor agencies. The attempt at integrating these services by one of the donor funded projects in Nigeria is used to illustrate this process. Working with government and other development partners, Global HIV/AIDS program in Nigeria (GHAIN) approached the integration of SRH and HIV services in 2005 using three main strategies, namely; creating an enabling environment for service integration, training of health care workers in

SRH-HIV integrated service delivery and the provision of integrated SRH/HIV care at pilot sites. They reported a slow start in the first year. This was attributed to the prior investment of the other development partners in their vertical programs.

In the second year, GHAIN concentrated on supporting the Federal Ministry of Health (FMOH) to identify, develop and implement the most appropriate RH-HIV integration model for Nigeria. This was done by constituting a technical working group for SRH-HIV service integration (ITWG) whose membership spanned the FMOH, members of the academia and representatives of other development partners and stakeholders. A baseline assessment was done to inform the government's policy on integration of SRH and HIV/AIDS services. As a first step however, the integration was focused on family planning services and HIV treatment and care. Based on experiences of projects implemented in other developing countries and the lessons learned from the pilot project in Nigeria, the FMOH developed policy guidelines for integrating SRH and HIV (FMOH, 2009). However, the availability of this policy and its implementation at the health facility level is uncertain. In the next section, the conceptual framework of the study is examined.

2.10 Conceptual framework

A conceptual framework provides a visual display of the factors associated with an outcome based on current understanding (Hairston,1982). Crankshaw and colleagues proposed a conceptual framework for HIV risk behaviour and achievement of reproductive goals among sero-discordant couples based on research in South Africa (Crankshaw et al., 2012). The basic principles for minimising risk while implementing reproductive action plans among HIV-positive persons could be essentially similar in other countries in sub-Saharan Africa. However, there are some remarkable differences between South Africa and northern Nigeria, the site of this study. With over 9 million predominantly Muslim inhabitants, Kano state, in northern Nigeria differs from South Africa, which is mainly Christian (73.5%) (Population Reference Bureau, 2013; NPC, 2007). Secondly, cultural practices such as polygyny are common and encouraged in northern Nigeria, but rare in South Africa. Polygynous marriages expand the sexual network and increase the complexity of the reproductive decision-making. Furthermore, counselling and realisation of safe conception becomes more complicated, in that though each pregnancy is between one man and a woman, the intricacies of polygynous households mean that sexual intercourse may be rationed depending on the number of wives,

hence the employment of some safe conception strategies may require sacrifices from co-wives.

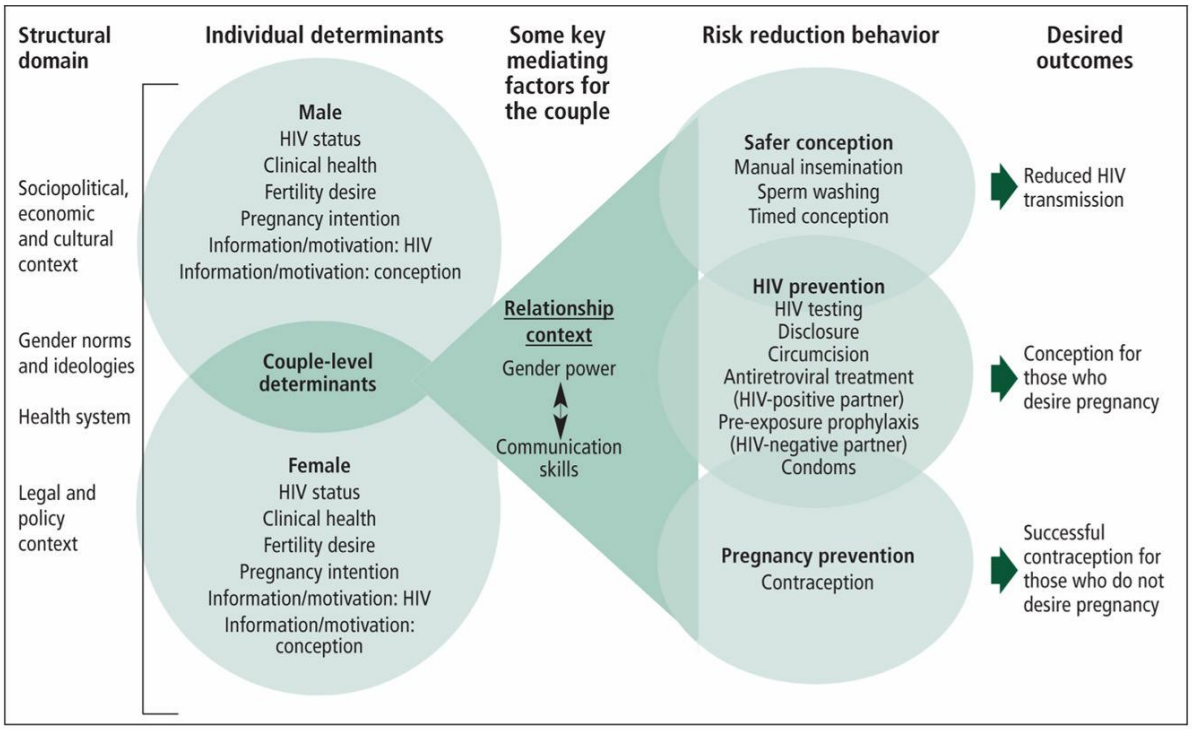
This poses unique challenges when counselling couples to limit unprotected intercourse to a woman's peak fertility period as a safe conception strategy (Matthews et al., 2010). It requires the cooperation and understanding of other wives, as the index woman's peak fertility may not coincide with her turn for sexual relations with the shared husband. Furthermore, the inherent rivalry and competition between co-wives makes this cooperation unlikely. In addition, this strategy exposes other wives to the risk of HIV infection if the man gets infected in the process. Thirdly, the sero-prevalence of HIV is higher in South Africa compared to Kano, northern Nigeria (FMOH, 2012; UNAIDS, 2012). Finally, health care service response to the HIV/AIDS epidemic may not be at the same level in the two settings. Therefore, while this model describes intrapersonal (individual), interpersonal (couple) and structural factors that modulate sexual and reproductive behaviour among HIV-positive people in South Africa quite well; its ability to capture the influences of cultural and health care service factors in northern Nigeria needs to be investigated. Incorporating context-specific factors could then make the framework more culturally-sensitive and robust thereby informing an integrated sexual and reproductive health service for HIV-positive men and their partners in northern Nigeria.

The current study provided an opportunity to test this model among HIV-positive men in Kano, northern Nigeria. It was meant to unravel if there were changes in libido, sexual activity, and risk-taking behaviour among HIV-positive men following diagnosis and ART treatment. In addition, the study determines the proportion of HIV-positive men who desire to have more children and their plans to bear children within three years. Furthermore, it compares them with their untested or HIV-negative contemporaries.

The framework shown in Figure 2.3 (p.41) explores HIV risk behaviour related to conception by building on existing models. It is a behavioural-ecological model combining theories across individual, couple and structural levels (Albarracin et al., 2005; Karney et al., 2010). The Information-Motivation-Behavioural Skill (IMB) model of HIV preventive behaviour (Fisher et al., 1996) formed the backbone of the model. Despite its limited scope, IMB was favoured based on performance, familiarity and wider applicability (Fisher et al., 1999; McCarraher et al., 2008; Matthews et al., 2013). This adapted framework had the following components: (1) the structural milieu, which has an overarching effect on the other

components, (2) individual partner factors, and (3) couple or relationship dynamics, all of which influence (4) HIV risk reduction and reproductive behaviour and (5) safe conception or effective contraception depending on choices.

Figure 2.3 Conceptual framework



From: Crankshaw T, L., Matthews L, T., Giddy J et al., (2012). A conceptual framework for understanding HIV risk behaviour in the context of supporting fertility goals among HIV serodiscordant couples. *Reprod Health Matters*. *20*,39 Suppl, 50–60.

Starting with the context within which decisions are made, the model considered:

2.10.1 Structural (institutional, community and policy) domain: This domain includes the socioeconomic, cultural, health care service, legal and political context within which individuals live and make reproductive choices. Cultural factors include gender norms, power relations and economic factors such as levels of poverty and income differentials. Apart from affecting individual decisions, these factors also affect HIV-related risk behaviour as exemplified by intimate partner violence resulting from misuse of power (Strebel et al., 2006; Dunkle et al., 2004). The societal expectation of behaviour shapes the thoughts and behaviour

of its members and has strong influence on individual decisions. Employment opportunities and dominance of men in the economic and political arena confers on them an undue advantage when it comes to major decisions (MacPhail et al., 2007). These differences are re-enforced in patriarchal societies where deviations from expected behaviour are sanctioned forcing members to conform (Jewkes et al., 2011). It is of interest to determine if the asymmetric gender power relations endured among HIV affected couples in northern Nigeria.

Other important structural components of this framework include health care service factors, legal environment, and policies that may enhance or hinder the achievement of reproductive goals in a safe manner. Health care service can impact access to information and services for safe conception. The attitude of health care workers towards sexual and reproductive health communication, the provision of risk reduction services such as ART chemoprophylaxis for the uninfected partner, limiting unprotected sexual intercourse to peak fertility period and male circumcision have all been associated with fertility desire among PLWHAs (Matthews, 2013). The level of knowledge of HIV-positive men regarding safe conception strategies and the attitude of health care workers towards integrating SRH services into comprehensive HIV care has not been documented in Kano, northern Nigeria. Furthermore, the effects of existing policies (e.g. free ART, free antenatal care, husbands consent as a pre-requisite for accessing family planning services, coverage of National Health Insurance and stringent abortion laws) can all affect access and uptake of services by HIV-positive men and their partners.

2.10.2 (Intrapersonal) Individual factors: The next level deals with the factors modulating reproductive and HIV risk behaviour at the individual level. This refers to the person's perceived and objective health status, HIV status and the desire or intention to have children. This is exemplified by the likelihood of an infected individual who after a period of ART treatment feels healthier and desires parenthood. The authors also differentiated between the wish to reproduce at some point in the future (fertility desire) and taking concrete steps to get pregnant or impregnate a partner (fertility intention). Previous studies in northern Nigeria (Iliyasu et al., 2009; Iliyasu et al., 2011) did not consider this subtle but important difference. Access to information for HIV risk reduction and motivation to conceive are other important individual factors considered in this model (Fisher et al., 2002). For instance, to achieve safe conception, a man needs to know his HIV test result (awareness), feel highly (motivated) leading to partner disclosure and communicate well with his partner (behavioural skill). Conversely, for those that are not desirous of reproduction, temporarily or permanently, a similar set of information, motivation and communication skills are required for the choice of

safe and effective means of contraception. In addition, individual level knowledge about HIV risk and safe conception strategies are vital. For example, studies have shown that the concept of sero-discordance is not well-understood among many HIV discordant couples (Bunnell et al., 2005; Matthews et al., 2013). Misconceptions abound, for instance, a study found that most respondents expected to have the same HIV status with their spouses in the long run, thereby ignoring protective measures. Similarly, HIV positive people whose partners tested negative tend to misconstrue this as evidence of innate protection against the virus (Matthews et al., 2013). These misconceptions may prevent adherence to effective risk reduction strategies. Enhanced understanding of the risks associated with sero-discordance improves couples' knowledge and motivate them to adopt safe sex and conception strategies. Although it was reported in a previous non-HIV related study in northern Nigeria that most pregnancies (96%) were unplanned, this may not necessarily be the case among HIV infected persons due to the heightened awareness of risk of death and the consequences of orphan hood (Iliyasu et al., 2010). Important as they are, knowledge, attitude and adoption of safe conception practices among men has also not been previously investigated in Kano, northern Nigeria. This study fills this information gap.

Other individual level determinants of reproductive behaviour and HIV risk reduction are the levels of motivation and behavioural skills. Perceived HIV risk to one's self, partner or offspring and the desire to have children are all strong motivating factors at individual level. However, lack of intention to conceive doesn't automatically lead to the use of contraceptives, indicating the complexity of human behaviour. Furthermore, changing circumstances and partners (especially in northern Nigeria, where divorce and re-marriage rates are quite high) could increase the number of sexual partners with its attendant risks (Rhine, 2009). An individual may not be desirous of a child, but changing circumstances may push them into reproduction to prove their love for a new partner or improve their share of his estate following the partner's death. Such complex motivations may not be voiced out or discussed with partners or health care providers in busy clinics. However, this may be revealed to tactful interviewers in confidential settings. These issues need to be investigated in northern Nigeria in order to prevent further spread of HIV while safeguarding the reproductive rights of PLWHAs. Strong will and specific skills are also required to implement safe conception strategies (Bandura et al., 1997), the first of which is disclosure of HIV status to the partner through effective communication (Crepaz and Marks, 2003; Arnold et al., 2008). Also, adherence to antiretroviral drugs by the infected partner is the key to

preventing the transmission to the uninfected partner (Cohen and Gay, 2010; Mills et al., 2006). Regardless of the current desire for parenthood, previous self-perceived fertility and experiences with contraceptive methods are likely to influence respondents' motivation and related behaviour (Matthews et al., 2013).

2.10.3 (Interpersonal) Couples-based determinants: The model pays particular attention to the relationship context and key factors that occur at the partnership interphase. Gender relations and power dynamics between the male-female pair may be harmonious or in disagreement. For instance, a partner's decision not to have children or vice versa may be at variance with the desire and intention of the other partner. How this plays out may depend on the partner's dominance or communication and convincing skills. Pregnancies that are unplanned are not necessarily unwanted (McQuillan, Greil & Shreffler, 2011). A pregnancy perceived as unwanted by one partner, may be precious to the other partner (Todd et al., 2006; Laher et al., 2009). It could also be envied by a co-wife in polygynous unions. The authors also drew attention to the important roles and power that men have regarding fertility desires and behaviour (Nakayiwa et al., 2006; Beyeza-Kashesya et al., 2010).

They considered men as vital to the successful implementation of safe conception strategies. Regardless of individual capacities, the key roles of gender dynamics and communication skills were highlighted as operating at the couple level. Intimate partner violence exemplifies the role played by relationship factors in increasing sexual risk, regardless of individual capabilities (Mittal, Senn & Carey, 2012). Female controlled contraceptive methods and ART chemoprophylaxis before or after exposure are considered effective in reducing the risks faced by abused women. Effective communication skills are also required for the successful use of condoms and timed unprotected sex at peak fertility (Karney et al., 2010; Darbes et al., 2008). Discussions among couples have been reported to increase the likelihood of safer sex than couples who do not communicate. Similarly, disclosure of status to the partner could encourage cooperation and partnership in realising reproductive goals and preventing high risk behaviour. Peculiar difficult circumstances of either partner, but more commonly females could lead to concessions regarding reproduction. Despite individual level desires, the need to preserve the marital relationship may overshadow one partner's desire leading to a behaviour that may be paradoxical to individual desires. Reaching consensus about reproductive decisions may be more difficult in polygynous unions, hence the need to test this model in northern Nigeria.

2.10.4 Risk reduction behaviour: This domain consists of three layers, namely; safer conception, prevention of HIV transmission to a partner and offspring and effective contraception for those who choose to postpone pregnancy or stop childbearing altogether. Strategies for safe conception consist of sperm washing in cases where the male partner is HIV infected (Vitorino et al., 2011; Bujan et al., 2007). For sero-discordant couples in which the male is uninfected, other options include artificial insemination or limited unprotected sexual intercourse during partner's peak fertility (Bekker et al., 2011). Furthermore, antiretroviral therapy minimises transmission risk to sexual partner and progeny (Cohen and Gay, 2010; Donnell et al., 2010). Local or systemic pre- or post-exposure antiretroviral prophylaxes have also been shown to reduce transmission (Van Damme et al., 2012; Baeten et al., 2012; Thigpen et al., 2012). All these strategies require partner testing, status disclosure among couples and a link to a comprehensive HIV care programme.

HIV prevention strategies, regardless of fertility intention, entail consistent condom use, medical circumcision of uninfected male, treating the infected partner with antiretroviral drugs when appropriate and pre-exposure systemic or topical antiretroviral prophylaxis for the uninfected partner. Although consistent condom use provides dual protection against heterosexual transmission of HIV and unwanted pregnancy, the pregnancy risk could be further reduced by adopting an additional method of contraception (Rochat et al., 2006; Hubacher et al., 2008). Temporary methods reported to be safe and effective for HIV infected women are barrier methods, combined oral contraceptive pills and intrauterine devices. However, drug-drug interactions between hormonal methods and ARTs have increased contraceptive failure rates. Similarly, progesterone-only injectables have been reported to increase the risk of HIV transmission (Heffron et al., 2012; Bekker et al., 2011). Permanent options for those who have completed their families include bilateral tubal ligature and vasectomy. Where it is legal, cases of contraceptive failure should have access to safe abortion care (Matthews et al., 2013).

2.10.5 Desired outcomes: This is the framework's last domain. It shows the three outcomes of the preceding decisions and influencing factors. A criticism of Crankshaw's model is the illogical arrangement of the three outcomes depicted in Figure 2.3 (p.41). To enhance clarity and logical reasoning the first two outcomes should be swapped starting with safe conception for those that are desirous of pregnancy, reduced HIV transmission risk and effective contraception for those who want to postpone pregnancy or stop child birth altogether. The previous domains modulate behaviours that will eventually lead to the different outcomes. In

the present study, this conceptual framework is applied to HIV-positive men and their partners in northern Nigeria. Thus, an ecological approach considering individual, couple and structural level factors that influenced sexual and reproductive behaviour of men was used. This model also addressed the criticism of other workers regarding biomedical models that tend to focus on individuals, ignoring the important role of couple level and socio-cultural milieu within which these reproductive decisions are made. Apart from their inclusion as far as possible in the model, this mixed methods study explored the context within which reproductive decisions were made and the facilitative or inhibitory effects of the health care service. Within the study setting in northern Nigeria, gender roles, socio-cultural and religious factors have strong influences on family life, including the reproductive decision-making process (Duze and Mohammed, 2006).

2.11 Chapter summary

This chapter outlines the search strategy used to assemble materials for the narrative literature review. Starting with a wide scoping search of keywords and thesauri related to sexual and reproductive behaviour of HIV-positive men, it was followed by focused search in specialised databases. In addition, it provided basic definitions of terms and concepts related to sexual behaviour including 'sexually active', 'coital frequency', 'condom use' and 'multiple sex partners'. Similarly the reproductive terms 'fertility desire' and 'fertility intention' were defined and the subtle difference between the two described. Furthermore, health care service in terms of policies and organization of human resources, equipment and supplies to meet the sexual and reproductive health needs of HIV-positive men and their partners.

Focusing on the research questions, existing studies on sexual and reproductive behaviour of HIV-positive men and the response of the health care service were critically reviewed and the conceptual framework underpinning the study was described. It concluded by highlighting the knowledge gaps that this study seeks to address.

It is clear from this review that the improved prognosis of people living with HIV occasioned by the availability of effective ARTs has brought into focus the peculiar sexual and reproductive health needs of PLWHA. However, little information exists about the current sexual and reproductive behaviour of HIV-positive men in northern Nigeria and the health care service response. Next is a description of the methods and findings of a systematic

review of existing information on sexual and reproductive behaviour of HIV-positive heterosexual men in sub-Saharan Africa. It would place this research in broader context and provide relevant literature for discussing the findings of the main study.

Chapter 3 Systematic review of literature

This chapter presents the background, methods and results of a systematic review of the sexual and reproductive behaviour of HIV-positive heterosexual African men in the antiretroviral era.

3.1 Background

Two-thirds of the world's HIV-infected people live in Africa [1]. In the early phase of the HIV epidemic, a positive HIV test was equated to a death sentence [2]. Most infected people became disinterested in life activities, including sex and procreation [3,4]. However, the advent of highly active antiretroviral therapy remarkably improved longevity and quality of life of those affected [5,6]. Despite a late start, sub-Saharan Africa now has an estimated 7.6 million people receiving antiretroviral drugs [7]. Consequently, HIV/AIDS has been transformed into a chronic, manageable disease, even in these resource-constrained settings. The renewed hope encouraged PLWHA to resume sexual activity and childbearing [8]. Although the proportion of PLWHA desirous of parenthood ranged from 16% to 61%, actual fertility was still low soon after the advent of highly active antiretroviral therapy (HAART) [9-12].

Previous systematic reviews of the sexual and fertility behaviour of PLWHA included both sexes [13] or were global in scope [14-17]. The review that included both sexes identified gender differences: men reported higher levels of unprotected sex, more favourable attitudes towards childbearing and higher levels of a desire for children than those reported by women [13,18]. However, none of the reviews focused exclusively on contemporary sexual and fertility behaviour of HIV-infected heterosexual African men receiving ART. This is the void that this review addresses. Given the decision-making powers conventionally accorded to men in Africa and their vital contribution to the heterosexual spread of HIV [19], the findings could inform sexual and reproductive health policy, research and practice.

The objective of this systematic review is to retrieve, critically appraise and synthesize quantitative and qualitative evidence on sexual and reproductive behaviour, and factors predicting behaviour, among HIV-positive heterosexual men in Africa during the antiretroviral era.

3.2 Methods

3.2.1 Search strategy

The P.I.C.O.C.S framework [20,21] was used to determine the eligibility of the studies according to five main dimensions: population, intervention/exposure, comparators, outcome, context and study design (Table 3.1).

Table 3.1 Criteria for inclusion of the studies retrieved from the literature.

Criteria	**Inclusion**	**Exclusion**
Population	HIV-positive men or studies of HIV-positive men and HIV-positive women	Studies that focus exclusively on HIV-positive women or HIV-positive men having sex with men
Intervention/Exposure	Studies that employed standard HIV testing methods. Respondents being aware of their HIV positive status for at least 6 months before the study. Respondents receiving antiretroviral drugs.	
Comparator (s)	HIV negative men. HIV positive men not receiving ART. Before and after HIV-positive diagnosis comparison.	
Outcome (s)	***Sexual behaviour*****:** sexual desire/libido, sexual activity, coital frequency, risky sexual behaviour (multiple sexual partners, inconsistent condom use and having sex with sero-negative partner or partner of unknown sero-status). ***Reproductive behaviour***: fertility desire, fertility intention, contraceptive use.	Studies that did not provide outcomes separately for men and women.
Context	Geographically restricted to studies conducted in Africa. English language & journals with English versions. Publications from 1st January 2004 to 31st August 2014.	Studies conducted outside Africa. Non-English language journals without English versions. Studies conducted before 1st January 2004 or after 31st August 2014.
Study design	Primary studies: cross sectional, case-control studies, cohort studies, RCTs. Quantitative, qualitative, mixed methods.	Review articles (except for checking their reference lists and citations).

3.2.2 Electronic bibliographic databases: The researcher and an assistant guided by an information specialist, searched relevant databases, including the Cochrane database and Campbell collaboration, for previous reviews on this subject. Subsequently, a search strategy

was developed. This included free text elements, medical subject headings (MeSH), related words and database-specific thesauri linked by Boolean connectors. One component focused on sexual behaviour: “sexual behaviour” OR “sexual lifestyle” OR “sexual relationship” AND (HIV OR AIDS) AND men AND Africa). The other component focused on reproductive behaviour: “fertility desire” OR “reproductive intention” AND HIV OR AIDS AND men AND Africa. These were combined into a single search strategy using the OR Boolean connector and searches were modified to meet unique database requirements. This strategy was used to retrieve literature from the following databases: PubMed, MEDLINE, Jstor, Web of Science, ASSIA, Science Direct, Proquest, PsycInfo and CINAHL, with limits set by publication year (1st January 2004 to 31st August 2014 inclusive). This was the period during which ART became widely available in Africa. Only material published in English was included. Studies about men who have sex with men were excluded. Publications retrieved from the different databases were exported to endnote X6 (Thomson Reuters) and duplicates were removed. Table 3.2 illustrates the specific search strategy used in one of the databases (PubMed).

Other search methods: 'grey' literature, ancestry and citation searches.

In addition, relevant journal articles, conference proceedings, theses and internal reports at the University of Sheffield and Bayero University library collections were searched. Authors were contacted for unpublished work, for information about ongoing research and for clarifications. Ancestry and citation searches were performed on key publications and on review articles. The process used to identify evidence for the review followed PRISMA guidelines [22].

Table 3.2 Search strategy used in PubMed database.

Steps	Search string
#1	("sexual behaviour" OR "sexual lifestyle" OR "sexual relationship") AND (HIV OR AIDS [Mesh]) AND men AND Africa) Limits: Humans, English, Publication Date from 1st January 2004-31st August 2014)
#2	("fertility desire" OR "reproductive intention") AND (HIV OR AIDS [Mesh]) AND men AND Africa) Limits: Humans, English, Publication Date from 1st January 2004-31st August 2014)
#3	(Homosexual[Mesh] OR Gay OR "men who have sex with men")
#4	#1 OR #2 NOT #3

3.2.3 Selection of studies

The researcher and an assistant independently assessed the retrieved studies for eligibility based on the criteria outlined in Table 3.1. Reading through each title and abstract, each reviewer identified publications fulfilling the inclusion criteria. Where a decision was not possible at this stage, a full text sift was conducted. The two reviewers discussed the studies that fulfilled the inclusion criteria and any disagreements were resolved through consultation with the supervisors.

3.2.4 Data extraction process

A data extraction form adapted from the template provided by the Centre for Reviews and Dissemination was used [20]. The form provides for the recording of basic information (authors, date, title of paper and journal details), followed by detailed information about each study (study design, study location, study objectives, study population, sample size and major findings) and the reviewer's comments. Whenever clarification was needed, the study authors were contacted for further information. Data extraction was also compared between the two reviewers and disagreements settled after discussion with each other and with the supervisors.

3.2.5 Critical appraisal

Two reviewers critically appraised the studies independently. The researcher and an assistant assessed the quality of studies fulfilling the inclusion criteria. The rigor of the methods employed and quality were assessed. As a result of the varied study designs, separate assessment methods were employed for quantitative, qualitative and mixed methods studies [23]. Internal and external validity were assessed for quantitative studies. The Critical Appraisal Skills Programme checklist was used to review cohort studies [24,25] while the STROBES checklist was used to evaluate cross sectional studies [26]. The CASP tools for qualitative studies were used to appraise rigour, credibility, and transferability of qualitative studies. Furthermore, mixed methods studies were evaluated against quantitative, qualitative and mixed methods criteria as recommended [27]. Therefore the corresponding components of mixed methods studies were critically appraised using checklists for quantitative and qualitative studies. Additionally, specific mixed methods criteria consisting of five items was used to assess the mixed methods as suggested by Creswell and Plano-Clark [28]. To assess study quality, 'yes', 'no', 'unclear' or 'not applicable' was used as appropriate. Based on these criteria, studies were broadly classified into three categories: low risk of bias - all quality criteria met; moderate risk of bias - one or more of the quality criteria only partly met; and high risk of bias - one or more criteria not met [29].

3.2.6 Data synthesis

Statistical pooling of the results of quantitative studies was inappropriate due to the heterogeneous nature of the studies. A narrative synthesis was therefore used for both quantitative and qualitative data [30] as used in other health science reviews [23]. This method summarises and explains study findings using text [31]. Initially, the studies were grouped and summarised separately based on quantitative or qualitative design. Similarly, data obtained from the quantitative and qualitative components of the mixed methods studies were included in the relevant group. Tables of the key characteristics and main outcomes for quantitative studies are provided as Appendix 11-14 (p.377). Qualitative findings were synthesised using a thematic framework and presented as a narrative. Thematic synthesis is similar to the thematic analysis of primary qualitative analysis in which major themes are constructed by reading, reflecting, comparing and interpreting the primary themes identified. Such major themes include verbatim data from respondents and interpretations from authors [21]. This approach, together with framework synthesis, is considered more relevant for policy-makers and health managers than the interpretative methods such as meta-

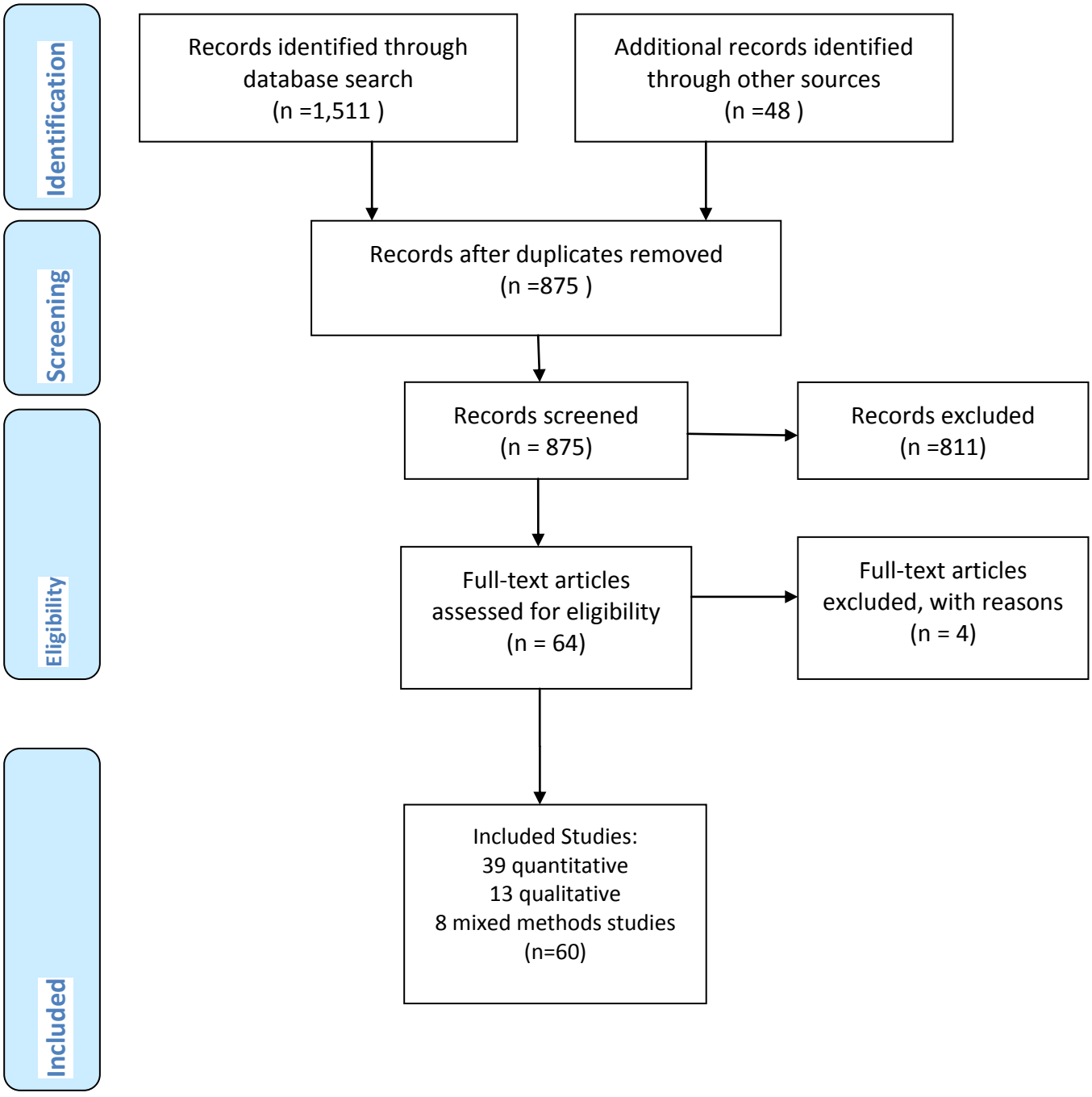
ethnography. The latter are usually reserved for conceptually-rich data and used for improving theoretical understanding of phenomena [21,32]. This was followed by triangulation of the findings from the different study designs to obtain evidence that answered the objectives of the review.

3.3 Results

3.3.1 Search Results

The literature search yielded a total of 1,559 citations. Most (*n*=1,511) came from electronic databases. A small number (*n*=48) came from other sources (grey literature, hand searches). After removal of duplicates, 875 records were left. The title and abstract sift revealed 811 irrelevant studies, leaving 64 articles [33-96]. Of these, 60 studies fulfilled the inclusion criteria after reading the full text. The four excluded studies were [44,63,67,74]. One of them [75] was an extension of ethnographic observations on a group recruited years earlier [74]. Therefore, only one of the publications [75] was included in the qualitative synthesis. The study selection process is illustrated using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart [22] (Fig 3.1).

Figure 3.1 Flow diagram of the study selection process



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097 (Moher et al., 2009)

3.3.2 Reasons for exclusion of studies

Reasons for excluding 811 publications from the review are categorized as those not fulfilling population, intervention/exposure, outcome, geographical location and design criteria in Table 3.3.

Table 3.3: Reasons for exclusion of 811 studies

Study number and reason for exclusion	Inclusion criteria	Exclusion criteria
Population Women only (HIV-positive):1-3,8,9,11-14,20,24,106,174,212,237,242,267, 308,317,318,330,331,334,345,347,348,349,350,359,366,367,401,414,415, 424,430,438,466,480,496,515,569,616,654,666,682,683,693,719,743,747,749,756, 757 758,759,761,762 Women only (HIV status not stated): 108,124,128,132,140,147,162,164, 169,170, 171, 176,190,201,207-210,236,275,282,287,292,311,312,316,335,357,361,364, 390,392,416,429,431,456,461,471,498,513,517,520,527,552,567,570,598,599,618, 619 ,620,623,632,637,640,652,661,663,671,679,688,698,703,726,728,732,734,738,746, 748 ,751 Women in prison: 273,563 Pregnant women: 399,680,750,753 Young women (HIV status not stated): 321,351,394,395,421,452,467,499,537,573, 605,609,655,692 Market women (HIV status not stated): 324,495,514 Fishermen (HIV status not stated): 447 Fisherman's wife: 398 Factory workers (HIV status not stated):344,444 Men (HIV status not stated): 182,221,288,289,322,343,355,402,404,428,497,503, 504,526,627,629,727,771,773,776,779,799 Military men (HIV status not stated): 229,397 Adolescents/Young people (HIV status not stated): 15,92,93,95,96,107,114,115,133, 139,143,148,197, 198, 200,226,227,245,246, 253,256,262,263,272,277,281,283,284, 319,337,338,339,340,352,360,365, 371,384,389,393,396,405,406,410,412,420,426,433,434,451,462,481,487,500,505, 506,507,521,528,542,543,556,560,584,589,604,613,625,631,642,643,651,653,667, 669, 681,686,699,708,713,731,739,767,775,795 Adolescent girls (HIV status not stated):440,453,458,459,465,501,603,608,622,630,650, 697,706,707,714,782 HIV positive female adolescents: 231,251 Adolescents with disability: 400,564 Disabled people:441 Female orphans: 518	HIV-positive men or studies of HIV-positive men and HIV-positive women	Studies that focus exclusively on HIV-positive women or HIV-positive men having sex with men

Infertile couples (HIV status not stated): 516 Men having sex with men:16,22,23,50,58,264,545,755,763,765,766,769,774,778,780 785,788,798,800,801,802,803,804,806,808,809 General population (HIV status not stated): 59,60,64,65,67,68,70,73,76, 80, 83,84, 89, 91,94,105,109,116,119,120,121,125,127, 137, 142,145,146, 150,154,155,160,161,165,202,203,204,213,215,220,239, 249,250,257,276,278,285,294,320,383,407,408,419,432,435,443,446,469, 470,472,477,478,479,482,483,486,488,493,512,525,530,531,532,536,540, 547,548,554,557,559,574,591,606,607,614,617,624,634,648,656,657,665, 668,673,676,684,685,687,690,691,694,695,702,705,716,720,722,724,725, 729,736,740,742,744,745,752,768,783,784,789,790,794,807,810 Peasant farmers (HIV status not stated): 141,234,473,492 Primary school pupils: 427 School Teachers (HIV-status not indicated): 66,71,255,310 University/High school students (HIV status not stated): 286,329,332,333,413,425,509,568,577,595,612,689 Farm workers/migrant farm workers (HIV status not stated): 126,247,248,733 Female sex workers (HIV-status not indicated): 69, 152, 153,252,484,644,730,735 Refugees/migrants, IDPs (HIV-status not indicated): 82,326,369,370 Out of school youth (HIV status not indicated): 101,489,490,491,580 Health care provider job aids, prevention: 104,271 HIV positive children: 454,455,674		
Intervention/Exposure Physical therapy in HIV/AIDS: 35 Conditional cash transfer: 87 Microbial gel (women): 90,380,445,475, 615,635,677,678,701,709 Family planning health talk (for women):511 Chlorhexidine vaginal wash (women): 519 Partner notification (female); 539	Studies that employed standard HIV testing methods. Respondents being aware of their HIV positive status for at least 6 months before the study. Respondents receiving antiretroviral drugs.	
Comparator (s)	HIV negative men. HIV positive men not receiving ART. Before and after HIV-positive diagnosis comparison.	
Outcome (s) Reproductive cancer: 5-7, Female (Infertility): 8,9,184 Female (contraception): 185,188,192,315 Bone density: 10 Nutritional status/BMI: 17,42,57	***Sexual behaviour*:** sexual desire/libido, sexual activity, coital frequency,	Studies that did not provide outcomes separately for men and

Human Resource: 18 Immunization: 19,40 Mental health/Psychological: 21,217,188,299 Depression/Suicide risk: 219,270 GIT symptoms: 25 Social response: 26 HPV vaccination (Females): 29, 54,129,280,297 Adolescent immunization: 134 Adult immunization-Recommended schedule for HIV positive: 32,47,159 Skin diseases in HIV/AIDS: 36,55 Leishmaniasis and HIV: 268 Trichomoniasis, HIV:546 Alcohol, HIV/AIDS: 592,660 Kaposi sarcoma: 586 Adult-Child bonding:596 Genomes, HIV: 593 Sexual and reproductive rights in conflict & crisis settings: 37,122, 195,235 ART resistance mechanisms/Adherence: 38,258, 259,658 Criminalization of sex trade/Child rape/Sexual abuse: 39,166,307,463,464 Quality of life, HIV-positive, women: 46,52 Maternal mortality, HIV/AIDS: 48,51 Hypertension, Migraine, HIV: 49 Adrenal, Kidney, HIV: 53 Illicit drug use/Khat use: 61,110,186,211 Neurological complications, HIV: 74,131,555,565,576,585 Abortion/Unsafe Abortion: 77,136,180,206,298,304,313 Vaginal practices: 85,172 Teenage pregnancy: 130,144 Bacterial vaginosis/Trichomonas vaginalis: 135,494 Multiple sclerosis, HIV/AIDS: 168 Economic consequences, HIV/AIDS 151 Community competence/empowerment: 223 Ethical/Legal issues, HIV/AIDS: 158, 194,196 Epstein-Barr Virus Seroconversion/Infectious Mononucleosis: 175 Communication media, HIV: 177,178 Female genital cutting, HIV: 181,266,524 Animal studies: 594 Postpartum resumption of sex (women): 193 Intimate partner violence/domestic violence: 216,218,265,306,356,372,403,579 Bride price: 232,233 Attrition from treatment:793 Knowledge: 238 HIV misconceptions (General populace): 244 HIV, the Elderly women:303 Intersubjectivity of HIV care: 353 Malaria,HIV,risks: 373 New slavery, HIV:377 Death & Dying, HIV:378 Substance abuse: 423,626	risky sexual behaviour (multiple sexual partners, inconsistent condom use and having sex with sero-negative partner or partner of unknown sero-status). ***Reproductive behaviour***: fertility desire, fertility intention, contraceptive use.	women.
Geographical location IUD & HIV in Asia: 43 Peri-coital Contraceptive Pill, India: 173 Unwanted childbearing, India:358 Youth friendly services, West Bengal and Jharkhand, India: 167 Young people, HIV, Iran: 187	Geographically restricted to studies conducted in Africa. English language &	Studies conducted outside Africa. Non-English

Abortion, HIV-positive, India: 44,63,81 Commercial sex contacts, Indian men:704 Domestic violence, unwanted pregnancy, India; 638 Abortion, North Vietnam: 157 Sexual communication, Vietnam: 305 Contraceptive use HIV USA:710 Men, fertility, rural Vietnam:354 Pregnancy outcome HIV-positive women, Bangladesh: 45, 62 Douching practices, USA: 75 Heterosexuals, HIV,USA: 811 Condom use, Women, China: 711 Living with HIV, Chennai, India:649 Casual sex, China:715 HIV, discrimination:786 Feminism in Bolivia: 561,562 Sexual risk taking, Haiti: 633 MSM, Jordan:796 HIV, Children, Bolivia: 675 Bhuddist women, HIV, India:662 Canada, HIV, pregnancy: 391 Gonorrhoea, HIV, Britain:698 Sperm washing, Italy:641 Resistant HIV, Los Angeles: 772 Age, sexual debut, Phillipines Love,desire, Ghujurati Indians:664 STI diagnosis, females, USA:78 HIV & Child bearing, Caribbean: 86 Women empowerment, HIV, Thailand: 659 Young married women, Tamil Nadu, India:541 Prostitution, Norway:639 Fertility, HIV, Women, Mexico:672 HIV, Syphilis, Australia: 781 Poverty, Marriage, HIV, Nepal: 88 Female sex workers, Nepal: 621 Pregnant adolescents, Jamaica: 103 Afro-Surinamese, Netherlands:112,214 Fertility intention, Bulgaria: 117,228 Brazil: 138 Contraceptive use, Cambodia:581 Female sex workers Indonesia: 578 Sexual & reproductive rights, Latin America:558 Oceania, demography: 549 HIV-positive women, Brazil: 411 Extramarital sex, Brazil: 291 Reliogisity, Sex, Brazil: 295 Religion, USA: 533 Domestic violence, Cambodia: 717 Child sex abuse, China 156 Unwanted sex, young women, India:588 Sexuality education, Spain: 183 Population change, Global: 191 Sectarianism, reproduction, Lebanon:544 Medical eligibility contraception, USA:199 Abstinence and Teenagers, USA: 279 Mode of delivery (HIV+ women, Western Europe: 240,241	journals with English versions. Publications from 1st January 2004 to 31st August 2014.	language journals without English versions. Studies conducted before 1st January 2004 or after 31st August 2014.

HIV conspiracy theories, African-American men: 243 Abortion, Latin America:363 Intimate Partner Violence, Infertility, USA: 460 Intimate Partner Violence, China:522 Cancer control, HIV, China, India, and Russia: 261, Young urban men, India:538 Domestic violence, North India: 636 Sexual Debut Among Chinese Youth: 269 Post test counselling, pregnant women, Vietnam Marital sexual behaviour: Vietnam: 610,611 Religion, contraception, Mexico:293 HIV, Asylum seekers, UK: 302 Women, HIV, Lebanon:336 Condom use, within marriage, Lebanon:362 Marital fertility, China:374 Health Related Quality of Life, HIV, France:791 Late presentation, HIV, men, France:792 HIV,Injecting drugs, Central Java:375 Adolescent childbearing, Nicaragua:385 Abortion, Global: 601 Courtship stories, Men, Papua New Guinea:386 Physical & sexual abuse, Bangladesh:582,583 School based HIV prevention, Mexico:422 Refugees Australia:442 Adolescent sex, Northern Lao:646 Women living with HIV, Vietnam, fertility desire:448 Peruvian blood donors: 457 Menstrual regulation, Dhaka, Bangladesh:476 Vietnamese, Migrant workers, sex life: 485		
Study design Editorial/Opinion/Commentary/discourse/Views: 27, 28, 33, 34, 41,72,97,98,99,100,101,102,111,118,123,179,205,224,225,230,290, 301,309,328,381,382,418,449,502,508,523,529,551,571,572,575,587,647,741 Technical consultation report: 31,712,718,805 Review/Meta-analysis: 56,113,149,163,260,296,368,388,436,450,468,474,510,700,721,723,737,754,764,777 Theoretical (Non-empirical): 222,254,300,314,323,325,327,341,342,376,379,387,409,417,437,439,553,566,597, 600,628,645,760,770,787,797 Methodology/protocol; 346,534,535,550,590,602	Primary studies: cross sectional, case-control studies, cohort studies, RCTs. Quantitative, qualitative, mixed methods.	Review articles (except for checking their reference lists and citations).

3.3.3 Exclusion based on unfulfilled population criteria

Seventy one research papers focused on women without specifying their HIV status while 58 studied HIV-positive women. In addition, 14 studies recruited young women without specifying their HIV status. Four studies were on pregnant women while two recruited women in prison. Eight studies were on female sex workers without stating their HIV status, three reported on market women while one each had fishermen and their wives as

respondents without stating their HIV status. One study was about infertile couples with no specification of their HIV status.

Eighty five publications recruited adolescents and young people (of both sexes) without specifying their HIV status. Similarly, five studies focused on out of school youths with no indication of their HIV status. Sixteen other studies recruited adolescent girls, 12 studies targeted university/high school students, one was among primary school pupils while four studied school teachers, all without indicating their HIV status. Two other studies were on HIV positive female adolescents, two on adolescents with disability and one each on disabled people and female orphans. Three studies were on HIV-positive children.

One hundred and twenty three publications were on the general population (both sexes) without specifying respondent's HIV status. Twenty two papers focused on men without stating their HIV status while 26 were about men who had sex with men without considering their HIV status. Two studies each had military men and factory workers as respondents without stating their HIV status. Four studies each were on male migrant farm workers and peasant farmers without indicating their HIV status. Another four were on refugees and migrants with unknown HIV status.

3.3.4 Exclusion based on unfulfilled intervention/exposure criteria

Studies excluded based on inappropriate intervention/exposure include: one that examined the effect of physical therapy on survival of HIV/AIDS patients, effects of conditional cash transfer on quality of life of female HIV patients, trial of microbial gel on HIV-positive women, impact of family planning health talk on contraceptive use among women and trial of chlorhexidine vaginal wash.

3.3.5 Exclusion based on inappropriate outcome

Studies that were excluded based on outcomes that were not the focus of this review include those that measured: Intimate partner violence/domestic violence (8), Abortion/Unsafe Abortion (7), Neurological complications of HIV (6) and Criminalization of sex trade/Child rape/Sexual abuse (5). Others had as their outcomes HPV vaccination among females (5), female sexual and reproductive rights in conflict & crisis settings (4), ART resistance mechanisms/Adherence (4) and female contraceptive use (4). Furthermore, studies were excluded for reporting mainly Mental health/Psychological measures (4), Illicit drug use/Khat

use (4), female infertility (3), Ethical/Legal issues & HIV/AIDS (3) and Reproductive cancers (3). Similarly, some studies were excluded for reporting only on female genital cutting & HIV (3), Nutritional status/BMI (3), recommended immunization schedule for HIV positive adults (3) and Immunization uptake (2). Others reported on Depression/Suicide risk (2), Skin diseases in HIV/AIDS (2), Alcohol, HIV/AIDS (2), Communication media and HIV (2) and Bride price (2). Furthermore, some studies were excluded on the basis of reporting only on Substance abuse (2), Vaginal practices (2), Teenage pregnancy (2), Bacterial vaginosis/Trichomonas vaginalis (2), Quality of life of HIV-positive women (2) and maternal mortality among women with HIV/AIDS (2). Single studies reporting outcomes that were not the main focus of this review include those that reported on: Attrition (1), Knowledge (1), HIV misconceptions among general populace (1), HIV and elderly women (1), Intersubjectivity of HIV care (1) and Malaria risks among PLWHA (1). Others reported on New slavery and HIV (1), Death, Dying and HIV (1), Animal studies (1), Postpartum resumption of sex among women (1), Epstein-Barr Virus Seroconversion/Infectious Mononucleosis (1), Multiple sclerosis and HIV/AIDS (1), Economic consequences, HIV/AIDS (1), Community competence/empowerment (1), Hypertension, Migraine and HIV (1), Adrenal glands, Kidneys and HIV (1), Kaposi sarcoma (1), Adult-Child bonding (1), Genomes, HIV (1), Leishmaniasis and HIV (1), Trichomoniasis and HIV (1), Adolescent immunization (1), GIT symptoms (1), Social response (1), Human Resource (1) and Bone density and HIV (1).

3.3.6 Exclusion based on geographical location of studies

Studies excluded based on geographical location outside of Africa include studies on IUD & HIV in Asia (1), Peri-coital Contraceptive Pill in India (1), Unwanted childbearing in India (1), Youth friendly services in West Bengal and Jharkhand, India (1), Abortion in HIV-positive women in India (3), Commercial sex contacts among Indian men (1), Domestic violence and unwanted pregnancy in India (1), Living with HIV in Chennai, India (1), Love and desire among Ghujurati Indians (1), Bhuddist women and HIV in India (1), Unwanted sex among young women in India (1), Young married women and HIV in Tamil Nadu, India (1), Cancer control among HIV positive women in China, India, and Russia (1), HIV among young urban men in India (1) and domestic violence in North India (1). Other studies excluded as a result of geographical location include studies on abortion in North Vietnam (1), Sexual communication in Vietnam (1), Men and fertility desires in rural Vietnam (1), Post test counselling among pregnant women in Vietnam (1), Marital sexual behaviour in

Vietnam (2), fertility desire among women living with HIV in Vietnam (1) and Vietnamese migrant workers' sex life (1). Other studies excluded based on location were on: Condom use among women in China (1), Casual sex in China (1), Child sex abuse in China (1), Intimate Partner Violence in China (1), Marital fertility in China (1) and Sexual Debut Among Chinese Youth (1). Other excluded studies include those conducted on: women living with HIV in Lebanon (1), Condom use within marriage in Lebanon (1), Pregnancy outcome among HIV-positive women in Bangladesh (2), Physical & sexual abuse in Bangladesh (2), Menstrual regulation in Dhaka, Bangladesh (1), Sexual risk taking in Haiti (1), Sexual & reproductive rights in Latin America (1), Abortion in Latin America (1) and School-based HIV prevention in Mexico (1).

Other studies excluded due to location include those conducted among young people living with HIV in Iran (1) HIV, discrimination in Pakistan (1), Feminism in Bolivia (2), Contraceptive use in Cambodia (1), Domestic violence in Cambodia (1), Afro-Surinamese living with HIV in the Netherlands (2), Fertility intention among PLWHA in Bulgaria (2), Poverty, Marriage and HIV in Nepal (1), Female sex workers and HIV in Nepal (1), HIV-positive women in Brazil (1), Extramarital sex in Brazil (1), Reliogisity, Sex, Brazil men (1), commercial sex work in Brazil (1), Mode of delivery among HIV positive women in Western Europe (2), Health Related Quality of Life among PLWHA in France (1), Late presentation of men living with HIV in France (1), HIV among Asylum seekers in the UK (1), HIV and Syphilis co-infection in Australia (1), HIV among refugees in Australia (1), Contraceptive use among HIV-positive women in the USA (1), Douching practices among women living with HIV in the USA (1), Heterosexuals living with HIV in the USA (1), Religion and HIV in the USA (1), Medical eligibility for contraception in the USA (1), Abstinence and Teenagers in the USA (1), Intimate Partner Violence and Infertility in the USA (1), STI diagnosis among females in the USA (1), Resistant HIV in Los Angeles, USA (1) and HIV conspiracy theories among African-American men in the USA (1),

The following studies were also excluded based on geographical location: MSM in Jordan (1), HIV among Children in Bolivia (1), HIV and pregnancy in Canada (1), Gonorrhoea and HIV in Britain (1), Sperm washing in Italy (1), Age at sexual debut in Phillipines (1), HIV & Child bearing in the Caribbean (1), Women empowerment and HIV in Thailand (1), Prostitution in Norway (1), Fertility among HIV-positive women in Mexico (1), Pregnant adolescents in Jamaica (1), Female sex workers in Indonesia (1), Oceania's demography and

HIV (1), Sexuality education in Spain (1), Population change and Global health (1), Sectarianism and reproduction in Lebanon (1), Religion and contraception in Mexico (1), HIV and Injecting drug use in Central Java (1), Adolescent childbearing in Nicaragua (1), Courtship stories among Men in Papua New Guinea (1), Adolescent sex in Northern Lao, PDR (1) Peruvian blood donors and HIV (1) and Abortion and HIV, a worldwide study.

3.3.7 Studies excluded due to design

Thirty one studies were excluded because they were editorials/opinion/commentary/discourse or views, 26 were theoretical, non-empirical studies while 20 publications were reviews/meta-analyses. Six papers were publications of methodology/study protocols while four were technical reports.

3.3.8 Included studies

The 60 included studies were published from 1st January 2004 to 31st August 2014. They were exclusively English language or multilingual papers with an English language version. They employed either quantitative (*n*=39), qualitative (*n*=13) or mixed methods (*n*=8) designs. Half (*n*=30/60) were conducted in East Africa, mainly in Uganda (*n*=15/60) [35,38-40, 48,49,51,52,57,58,78-80,82-89], Ethiopia (*n*=7/60) [33,37,43,47,85,92], Kenya (n=6/60) [70,81,83,86,88] and Tanzania (2/60) [36,55]. Fifteen were from South Africa (*n*=15/60) [42,45,53,54,65,66,69,72,73,76,77,90,91,95,96] and one each from the neighboring states of Swaziland (*n*=1/60) [84], Botswana (*n*=1/60) [50], Zimbabwe (*n*=1/60) [60] and Mozambique (*n*=1/60) [68]. Other studies were from West Africa, mainly Nigeria (*n*=6/60) [41,46,64,75,93,94], Togo (*n*=3/60) [56,61,87](Nakayiwa et al., 2006; Yaya et al., 2014; Moore and Amey, 2008) and Ghana (*n*=1/60) [59]. One study was reported from Cameroon (*n*=1/60) [62] in Central Africa.

3.3.9 Study characteristics

Quantitative studies

The 47 quantitative studies reviewed were drawn from 39 purely quantitative designs and eight quantitative components of mixed methods studies. These studies are shown in Table 3.3.The majority 87% (*n*=41) were cross-sectional [33,34,37,38,40-43,46-50,52,53,55,57,59,61,62,64-66,68-70,73,76-79,81,82,85,88,89,91-96], and five were cohort studies [35,39,51,80,90], while one was a randomized control trial [62]. Most studies 96%

(*n*=45) were based in hospitals or clinics [33-35,37-43,46-53,57,59,61,62,64-66,68-70,73,76-80,82,85,88-96].

All studies recruited both sexes. Sample sizes ranged from 114 to 6,263. Almost three quarters (*n*=34) of the studies were of medium size with 101 to 500 participants [33,35,39,42,43,46,48,49,51,52,56,57,59,61,64,68-70,73,76-82,85,88-92,94,95], while over a third (*n*=19) were large with ≥500 participants [35,37,39,40,43,47,51,53,69,70,73,76-81,89,90]. Men constituted 8% to 61% of the samples.

Respondents were 18 years or older in most 72% (*n*=34) studies [33,35,39,42,43,46,48,49,51,52,56,57,59,61,64,68-70,73,76-82,85,88-92,94,95] but younger people ≥15 years of age were also interviewed in seven studies [31,34,38,40,41,47,55] while the exact age limits were unclear in the remaining six studies [37,50,53,62,65,66].

Response rates were reported in 29 (62%) studies [34,35,38-42,47,48,50,52,53,57,61,64,66,68,70,73,78,80,82,85,88,90,93-96]. This ranged from 63% to 100% (median: 95%). The majority of study protocols 85% (*n*=40) were reportedly approved by institutional research ethics committees [34,35,38,40-43,46-49,51-53,55,57,59,61,62,64,65,68,70,73,76-82,85,88,90-96].

Table 3.4 Quantitative study characteristics

Serial No. [Study No.]	Design & setting	Gender group	Age range	N	Outcomes measured
1[1] [MM]	Cross-sectional, health facility, Southern Ethiopia	Men & women	18-59	321 95 Men	Sexual Behaviour (Sexually active or not in preceding 6 months), Condom Use (Yes, No, ; how often, always (consistent) or sometimes), multiple sex partners within preceding 6 months Reproductive Health: Number of existing children (grouped into None, 1, 2, 3 or more) Fertility intentions (intention to have children in the future, Yes or No), Time preference to have children (<1 yr, 1-2 yrs, >2 yrs, don't know the time); Number of children desired (1, 2, 3, >3), Reasons for not wanting children; partner/spouse wants more children? (Yes, No, Don't know, Don't have a partner) Predictors of fertility desire
2[2]	Cross sectional,	Men & Women	15-60	307	Fertility desire; desire to have children in future (Yes, No)

	health facility, northern Ethiopia			185 Men	Predictors of fertility desire
3[3]	Prospective cohort, home based, Uganda	Men & Women	18-56+	926 235 Men	abstinence (no sexual intercourse during the prior 3 months), Condom use (condom use for the previous 3 months as 'always', 'sometimes', or 'never'), partner status (the serostatus of all sex partners reported as (positive, negative or unknown) and type of sex partner (Spousal, steady or casual). Risky sexual behaviour (condom use as never or inconsistent use with seronegative or partner of unknown serostatus).
4[5] [MM]	Cross sectional Mixed methods, Ethiopia	Men and Women	Not stated	507 Number of men, not stated	Fertility desire-desire to be biological parent in the future (Yes, No)
5[6]	Cross sectional survey, Uganda	Men and women (mutually disclosed couples)	15-45+	114 couples; 114 Men	Wish for more children (classified as definitely, maybe, don't know and not at all) later two combined to mean no desire); condom use in preceding 12 months classified as "Never", "Sometimes", or "Always". The first two options were interpreted as inconsistent condom use while "Always" was considered consistent use. Also identified were fertility desire predictors
6[7] * An extension of the observation in study [3]	Prospective cohort, home-based ART in rural Uganda	Men and women	18-56+	926 235 Men	Risky sexual behaviour (inconsistent or no condom use with partners that have not been tested for HIV or were found to be HIV-negative in the previous 3 months)
7[8]	National representative household survey, Uganda	Men and women	15-59	1092 428 Men	Sexual behaviour (activity in 12 months), number of partners, condom use; reasons for condom non-use); other HIV risk factors Risky behaviour (unprotected sex at last sex encounter with any partner in the previous 12 months). Previous widowhood. Having an STI or STI-related symptom in the previous 12 months
8[9]	Cross sectional, hospital based, north central Nigeria	Men and women	15+	253 95 Men	Sexual behaviour (condom use (ever use-Yes/No, consistency-Always, Occasional); reasons for non-use; Condom use with spouse, stable partners, casual partners; Condom use by partner serostatus (HIV+, HIV-, Status

					unknown); Condom use by disclosure; factors associated with condom use)
9[10]	Cross sectional, Facility based, South Africa	Men and women	18+	459 174 Men	Disclosure, fertility behaviour-fertility intentions measured as follows: 'Which of the following statements best describes your thinking about you/your main partner having a child'. Choices offered were: 'I want to have a child right now; I may want to have a child in the next 12 months; I may want to have a child sometime in the future; I do not know/am unsure about whether I may want to have a child in the future; and I have decided that I do not want to have a child in the future'. (desire, intention now, 12 months, future, never); predictors of intention
10[11]	Cross sectional, Facility based, Ethiopia	Men and women	18+	601 270 Men	Sex with seropositive, seronegative or untested partner in the preceding 3 months without condom protection represented risky sexual behaviour. Consistent condom use, reasons for non-use of condom

11[14]	Cross sectional, Facility based Nigeria	Men and women	18-58	195 88 Men	Fertility desire (desire to have children Yes/ No), reasons for wanting more children and deterrents of reproduction
12[15] MM	Cross sectional, facility based Northern Ethiopia	Married Men and women	15-59	962 481 Men	Fertility decision (defined as current wanted pregnancy and/or current practice/effort to have a child after the knowledge of positive sero status). Predictors of fertility decision
13[16]	Cross sectional comparative study, Health facility based rural Uganda	Married or cohabiting men and women	18-44	421 36% men 199 HIV+ 222 HIV-	Fertility desire ('Do you want more children', Yes/No OR if partner currently pregnant, 'Do you want more children in addition to the current pregnancy' Yes/No). Association between HIV+ status and desire to stop child bearing-sub-analysis done by sex
14[17]	Cross sectional facility based, Kabale, Uganda	Men and women	<24-50+	400 101 Men	Sexual activity (last 3 months), condom use, number of partners, change of regular sex partner since HIV+ diagnosis, disclosure, partner status How an individual felt about conceiving in future (specifically whether respondent wants to bear a child in two years time), Factors associated with fertility desire, child production since HIV+ diagnosis, number of living children, number of death children
15[18]	Cross sectional, Facility based and from Support groups (66%) and ARV clinics (34%) Botswana living in rural (41%) and urban (59%) areas	Men and women	Age range not provided	500 209 Men	Status disclosure to anybody (Yes/No), status disclosure to partner(s) (Yes/No), Sexual activity in preceding three months (Active/Not active), number and type of relationship with partners classified as steady, spousal or casual. Alcohol use or drug use preceding sexual intercourse. Frequency of sexual intercourse-vaginal or anal, condom use (consistent or inconsistent) specified by partner
16[19]	Prospective cohort of ART enrolees living within 5 kms of a Facility in South western Uganda	Men and women	18+ years	506 30% Men	Sexual activity (in the past 3 months), risky sexual behaviour (RSB) defined as having unprotected sex with a sero-discordant or unknown status partner, or unprotected sex with a casual partner in the prior three months. Predictors of RSB

17[20]	Cross sectional comparative study-those on HAART and those not on HAART, Rural Uganda	Men and women	18-44 years	199 (38.1% male) 122 on HAART; 77 not on HAART > female participants on HAART compared to males (41.8% vs. 33.8%)	Fertility desire ("Do you want more children in future" Yes/No) and for those who are or partners are currently pregnant ("Do you want more children in future in addition to the current pregnancy"), contraceptive use (frequency of different types stratified by sex). Predictors of fertility desire
18[21]	Cross sectional facility based (stratified rural-urban) South Africa	Men and women	Not stated	3819 572 Men Urban; 329 Men rural	Status disclosure to anybody (Yes/No), Previous STI (Yes/No), sex partner types (regular, casual). Alcohol use ever (Yes/No). Risky sexual behaviour (condom use, regular or casual sex partners). Condom use categorized as consistent or inconsistent. Consistent condom use predictors.
19[23]	cross-sectional study of all PLWHA residing in Kahe ward in rural Kilimanjaro Tanzania	Men and women	15-49 years	410 146 Men	Fertility desire (future childbearing expectation), and fertility intention (future intended number of children), mean desired total children over a lifetime, currently pregnant partner. Fertility desire predictors
20[24]	Cross sectional facility based, Eastern Uganda	Men and women	18+ years	1092 488 Men	Sexual activity; considered active if had one or more sex partner in preceding 3 months otherwise abstinent. Fertility desire (wanting more children), reasons (respondent's perception of importance partner attaches to having more children) (very important, important, somewhat important, not very important and don't know). Fertility desire predictors

21[25]	Cross sectional, facility based, Ghana	Men and women	19+ years	267 43 Men	Sexual activity in previous 3 months, history of STI, Partners characteristics (regular sexual partner, HIV status). Sexual risk behaviours (number and condom use with partners in the preceding 3 months, STI history after positive HIV test, partner serostatus); HIV treatment beliefs, perceived transmission risk, hope and attitude to life, status disclosure to family and partner(s). Condom use predictors
22[29]	Cross sectional, facility based, Sokodé, Togo	Men and women	18-68 years	291 28.9% Men	Sexual activity, risky sexual behaviour (having sex without condom with seronegative or partner of unknown status in the past 3 months. Unsafe sex predictors
23[30]	Longitudinal data collected within an RCT, in rural health facilities in Cameroon	Men and women	Median (IQR)=35(29-42)	459 280 Men	Sexual activity at baseline, 6 months, 12 months and 24 months on ART. Reproductive life and sexual behaviours during the previous three months: having biological children, desire to have a/ another child; number of sexual partners including casual partners (1, 2–4, 5–10, .10), frequency of sexual relationships (less than once a month, once a month, several times a month, several times a week, daily); knowledge of the HIV status of one's main sexual partner (HIV-negative, HIV-positive, unknown); condom use assessed separately for the main partner and for casual partners using a four-point Likert scale (never, sometimes, nearly always, always).Predictors of sexual activity, inconsistent condom use (ICU) Desire to have any/more children
24[32]	Cross sectional, facility based Sagamu Nigeria	Men and women	18-55 years	147 52 Men	Self-reported general health and physical functioning were separately noted on a scale of 0.0-10.0, where higher scores reflected better general health and physical functioning. Emotional well-being described the state of mind that was most frequently experienced by the respondent in the previous four weeks out of the following: happy, sad, calm and peaceful and depressed. Fertility desire (defined by a "yes" or "no" response to the question:

					"Would you like to have a/another child in the future?", fertility intention Among those who answered "yes" to this question, fertility intention or expectation was defined by the response to a separate question: "How many children do you intend to bear in the future?" The answer 0 was coded as "no intention" and 1 and above as "intends fertility."Predictors of fertility desire and fertility intention
25[33]	Cross sectional STI clinic based, Cape town South Africa	Men and women	Age range not indicated Mean=29.6 (SD = 7.8) years	218 50 Men	Sexual risk behaviours (no. of partners, serostatus of partner (s) (positive, negative or unknown), condom use (at last sex and % condom use), alcohol and substance use (Yes/No). Predictors of unprotected sex
26[34]	Cross sectional urban ART clinic, Kwazulu Natal, South Africa	Men and women	34 years (SD 5.93)	152 69 men	Unprotected sex was assessed for each sexual partner in the preceding 3 months (number of sexual events (vaginal, anal, and oral sex) with each partner, condom use for each sexual event, each partner's perceived HIV serostatus (HIV positive, HIV negative, or unknown), the partner type (steady or casual), and disclosure (Yes/No). Forced sex (Yes/No), alcohol use during sex in the previous 3 months on a five-point scale with 1='never' and 5='always'
27[36]	Cross sectional hospital based, Mozambique	Men and women	At least 18 years	277 121 Men	number of sexual partners 12 months prior to and 12 following commencement of treatment. Frequency and nature of sexual encounters (i.e., oral, anal, or vaginal) for each of the participants' most recent partners in the preceding quarter, and the frequency of correct and consistent condom use (i.e., number of times condoms were used minus breakage, slippage or incorrect application). Treatment optimism (defined as ''minimizing, discounting, or discrediting the threat of HIV/AIDS''. Two sets of culturally adapted measures assessed prevention related attitudes and perceptions of ART medication. Participants responded to 5 items on their attitudes about HIV/AIDS since

					ART treatment, including HIV/AIDS being less of a threat, less worry about transmitting HIV, believing there is now nearly a cure, HIV/AIDS is less serious than in the past, and being HIV-positive is not a big problem now that treatment is available)

28[37]	Cross-sectional baseline comparison of a cohort of Pre-ART & ART eligibles, Kwazulu Natal, South Africa	Men and women	18+ years	632 Total; 247 in the pre-ART group (35 Men) and 385 in the ART-eligible group (141 Men)	Outcome measures (a) being sexually active in the last month; (b) disclosure of HIV status to current partner; (c) knowing the HIV status of one's current partner; and (d) condom use at last sex. Predictors of risky sexual behaviour.
29[38]	Cross-sectional community-health clinic based study Kenya	Men and women	18+ years	515 167 Men	Sexual behaviour related outcomes were categorized and coded as follows: consistent condom use (yes="always", no="never or sometimes"); sexual partners in the previous six months (zero or one sexual partner in the previous six months vs. two or more sexual partners).
30[41]	Cross sectional study. Survey venues were selected based on known supportive services (e.g. support groups, 38%), treatment services (e.g. clinics, 39%) and by word-of-mouth (Chain) recruitment (23%). Cape town, South Africa	Men and women	18+ years	1,055 414 Men	History of STI other than HIV (Yes/No). Exchange of sex for money or a place to stay (Yes/No), injection drug use or had an injecting drug user as a sex partner (Yes/No). Typically had sex with men (Yes/No). Non-disclosure to sex partner(s) in past 3 months (Yes/No): Discrimination-whether they had been treated differently after disclosing their HIV status to friends, family, employers and others (Yes/No). Number of sex partners in the previous 3 months (concordant, non-concordant, status unknown); Number of times they had engaged in vaginal intercourse with the different types of partners. Responses were collected separately for intercourse with and without condoms. The same format was used for collecting rates of protected and unprotected anal intercourse. Proportion of protected intercourse ascertained.
31[44]	Cross sectional, hospital based study of HIV positive patients in Soweto, South Africa	Men and women	18+ years	1,542 245 Men	Condom use (always, occasionally, and never), Coital frequency, duration of the relationship, partner HIV status (HIV positive, HIV negative, or HIV status unknown) "Sexually active" was defined as reporting having had sex in the last 6 months; unprotected sex was defined as occasionally or never using condoms in the last 6 months. Multiple sex partners

					was defined as reporting >1 sex partner in the last 6 months. Average duration of relationship was assessed by asking "for how many months have you been having sex with each partner?" Predictors of the four outcomes.
32[45]	Cohort study among attendees of HIV care centres in metroplitan and rural communities. South Africa	Men and women	18+ years	6263 1554 Men	Sexual behaviours; had a regular partner (Yes/No); Casual sex partner (Yes/no);frequency of condom use (with both regular and casual partners (if they had one). Consistent condom use was defined as self-report of always using a condom with a sex partner. Recall for these questions were the 6 months since the last clinic visit. Predictors of 3 main outcomes
33[46]	Crossectional hospital based study (a baseline for a cohort). Uganda	Men and women	18+ years	767 HIV (34% male)	Relationship status (married/committed relationship/or had a regular partner); Disclosure to partner (Yes/No); knowledge of HIV status of partner (Positive/Negative/Unknown); Condom use in the past 6 months; Number of children parented; Whether or not partner currently pregnant or given birth within the past 12 months. Predictors of fertility desire and intention
34[48]	Prospective hospital based study, Uganda	Men and women	18+ years	559 173 Men	Sexual behaviours during the previous six months, knowledge/beliefs about ART and HIV transmission; Marital status (married or cohabiting/unmarried if they were single, widowed or divorced); sexually active if they had had sex in the previous six months/ unprotected sex if they did not use a condom at last sex/multiple partners if they had two or more partners in the previous twelve months. Clinical status (WHO clinical stage and Karnofsky performance score)/CD4+ T cell count).
35[50]	Comparative crossectional hospital based study, Uganda	Men and women	18+ years	190 ART initiated, 190 ART naïve 127 of 380 were men	Sexual behaviour, number and type of sexual partners, symptoms of STls (urethral discharge, genital ulcer, low abdominal pain or vaginal discharge); pregnancy or causing a pregnancy; consumption of alcohol; having biological children; desire for

					more children and use of condoms; engagement in high risk sex (having had sex with a regular or non regular partner without a condom in the last 12 months).
36[53]	Cross sectional hospital based study, 6 Addis Ababa hospitals, Ethiopia	Men and women	18 to 49 women, 18 to 59 men	460 216 Men	Fertility desire-desire to have children (Yes/No); planning to have a child within two years (Yes/No). Predictors of fertility desire
37[56]	Prospective hospital cohort study, Mombasa, Kenya	Men and women	18 years or older	234 85 Men	Heterosexual, homosexual contacts within preceding 12 months; types of partner (regular/non-regular/commercial); condom use; disclosure to partners; knowledge, attitude towards ART and its effect on HIV transmission risk; history of STI; unsafe sex as any unprotected sex with person of unknown HIV status or HIV negative status; Perceived stigma on Berger's scale (low/moderate/high); depression on Beck's depression inventor.
38[58]	Prospective hospital cohort, Kwazulu Natal, South Africa	Men and women	18-67 years	735 217 Men	No. of sex partners in the preceding 3 months; Condom use; treatment optimism, internalized stigma
39[59]	Cross sectional hospital based study, Cape town, South Africa	Men and women	18-55 years	149 44 Men	Sexual activity in preceding 1 and 6 months, condom use at last sex; partner characteristics; sex under alcohol/drug influence; sex with i/v drug user; sex with partner known for 1 day; psychiatric morbidity (Mini international neuropsychiatric interview instrument); negative life events (scale); coping behaviours (COPE scale)
40[60]	Cross sectional facility based study, Gondar, Ethiopia	Men and women	18+ adults	389 44% Men	Fertility desire; use of family planning devices; future plan to use family planning methods Predictors of fertility desire
41[61]	Crossectional hospital based study, Kano, Nigeria	Men and women	15-55 years	340 85 Men	Sexual activity in the preceding 6 months; partner characteristics; disclosure; desire to have more children; No. desired; predictors of desire

42[62] [MM]	Cross sectional hospital based study, Kano, Nigeria	Men and women	18+ years	205 91 Men	Sexual activity since diagnosis; multiple sex partners; condom use
43[47] [MM]	Cluster-randomised equivalence trial of care strategies for PLWHA starting ART Uganda	Men and women	18+ years	1453 (29.5% men)	A comparison of lay health worker provided home care and facility based care.
44[49] [MM],	Cross sectional, Community based Nairobi Kenya	Men and women	18+ years	513 193 Men (38%)	Fertility desire, independent predictors and rationale for such desires
45 [63]	Cross sectional Hospital based South Africa	Men and women	Not stated	311	Fertility intention, independent predictors, Odd ratios

MM=mixed methods study

Qualitative studies

The characteristics of the qualitative studies are shown in Table 3.4. Of the thirteen qualitative studies [36,45,54,56,58,60,71,72,75,83,84,86,87] and eight qualitative components of mixed methods studies reviewed [33,37,47,79,81,89,94,95], seven explored post-diagnosis sexual behaviour and motivations [36,56,79,81,84,87,94] whilst four explored risk reduction strategies [71,72,83,89].

Six other studies examined fertility desire and reproductive decision-making [33,37,47,79,81,89,94,95] while two assessed the effects of stigma [37,58]. One study investigated both sexual and reproductive behaviours [86]. Seventeen studies employed in-depth interviews (IDIs) [33,36,37,45,47,54,56,58,60,71,72,81,83,87-89,95] while one combined the two methods [84]. Another study used both in-depth interviews and participant observation [79], while one was an ethnographic study [75].The sample sizes for IDIs ranged from nine to forty one. There were between eight to ten participants in each FGD. Most studies (*n*=13/21) interviewed both HIV-positive men and women [33,37,45,56,58,72,79,81,83,84,87,94,95] while two studies interviewed only men [36,71]. Participants were 18 years or older and purposively sampled in all qualitative studies.

Table 3.5 Qualitative study characteristics

S No. [Study No.]	Research Aim	Sample size	Data collection	Sample characteristics
1. [1] [MM] Ethiopia	to assess fertility desire and contraceptive utilization among people living with HIV/AIDs on ART	Total study sample size (Both quantitative and qualitative) =321 Sub-sample size for IDI not indicated	In-depth interviews	For purposive sampling, study subjects were selected based on their sex, age, number of children, marital status and education, and family planning use. The interview included respondents and key informants (health care provider working in PMTCT, VCT, ART and FP department) till saturation of information.
2. [4], Tanzania	To explore Tanzanian men's experiences regarding their health and sex life after they had been diagnosed with HIV	10 men	In-depth interviews	All participants were men, able to read and write in Kiswahili, present at the selected settings (government and NGO hospitals) during the study days, and had known for more than one year that they were HIV positive.
3. [5] [MM], Ethiopia	To determine attitudes towards having	32 total interviews (number of	In-depth interviews	HIV positive patients receiving treatment in public hospitals

	biological children among HIV positive people	interviews with men, not stated)		
4. [13] South Africa	To comprehend choices regarding parenthood among PLWHA	20 men	In-depth interviews	Men and women living with HIV seen at government owned primary care facilities
5. [15] [MM] Ethiopia	to assess the pattern of and identify factors, which play a role in fertility decisions of PLWHA	6 health care providers	In-depth interviews	Qualitative study included purposively selected counsellors from each health unit.
6. [22] South Africa	to explore reproductive decision-making, understanding of risk to sex partners, awareness and application of methods to minimize transmission to partner and child among men and women living with HIV negative partners	20 men	In-depth interviews	Purposive sampling from patients awaiting clinical consultation. ART clinics were the source of HIV-positive men while PMTCT in addition to ART clinics were the sources of female participants. Included were those between 18 and 45 years (inclusive), Sero-positive for HIV, women that were pregnant in the preceding 12 months, HIV seronegative or untested partner before the pregnancy from record and ability to speak and understand Zulu and English languages
7. [24] Togo	To uncover what motivates and explanations for pattern of sexual behaviour among PLWHA. They explored the thinking process, how participants felt, their perspectives, what they went through because of their HIV status	88 total 36% men	In-depth interviews	HIV positive men and women, mostly married (39), average age 35 years; being aware of their HIV status for at least 14 months, predominantly from lower socioeconomic class and have had formal education for about 7 years
8. [26] Uganda	describes how each dimension of the stigma process and environment influenced the desire to have children among PLHIV in Gulu, northern	12 males and 14 females	In-depth interviews	The participants were HIV-positive, lived in Gulu district or the surrounds. A wide range of participants were selected to ensure representation from various ages between 15 and 49 years, sex, residence, number of children and time since HIV diagnosis. Sample included HIV-positive men who had fathered children and HIV-positive women who had had children and/or

	Uganda.			pregnancies since their HIV diagnosis. A few participants who had not had children since their HIV status was diagnosed were incuded. Five male participants had fathered children
9.[28] Zimbabwe	Explored the influence of improved access to ART since 2004 shaped on reproductive wishes of PLWHAs.	In-depth interviews with 15 couples seroconcordant or serodiscordant for HIV	In-depth interviews	Respondents included 13 HIV seroconcordant couples and 2 serodiscordant ones. Age ranged from 24 to 48 with median of 36. Inclusion criteria were: having a seropositive partner, between 24 and 48, being intimate, disclosure to partner and wishing to bear a child
10. [39] Kenya	To identify sexual risk reduction strategies and how supportive socio-cultural and local context are to HIV-positive men	In-depth interviews with 20 men attending HIV-clinic	In-depth interviews	Men recruited from African Medical and Research Foundation clinic in Nairobi's urban slum. They all had chronic sickness before commencing ART.
11. [40] South Africa	Disclosure and reasons for non-disclosure; and condom use	In-depth interviews-majority women (41) only 14 men.	In-depth interviews	A sample of HIV positive patients in rural area of South Africa. The sample consisted of post-test counselled clients (41 women and 14 men who tested HIV-positive)
12. [43] Nigeria	An exploration of the childbearing among women and men living with HIV in south east Nigeria revealing how actions inimical to medical advice are tolerated so long as it would lead to achievement of procreation ambitions.	Interviews were conducted with 22 individuals (11 men and 11 women)	ethnographic methods of participant observation and in-depth interviews	The sample was opportune consisting of same number of men and women in different age groups and with different marital status. Duration of ART treatment ranged from 6 months to 6 years.
13. [47] [MM] Uganda	to explore the personal experience of sexual behaviour trend of those taking ARTs, interest was in providing the context within which behaviours occur, further	Semi-structured interviews with forty newly enrolled participants	In-depth interviews and observation	Participants' age range (22-62 years). Respective median age for men and women were 40 and 35 years.

	comprehension of social and environmental milieu			
14. [49] [MM] Kenya	To characterise the experiences of heterosexual men and women living with HIV Post-diagnosis and explain these experiences in relation to their identity and sexuality	in-depth interviews with 41 men and women; 14 KII with health care workers	IDI and KII	Respondents were recruited from the Nairobi Urban Slum Demographic and Health Surveillance System through quota sampling on the basis of seroprevalence ratios and sociodemographic characteristics in the study sites
15. [51] Kenya	1-How respondents in urban slum settlements narrate their sexuality experiences-2 How these narratives intersect with components of the ABC approach and how urban slum residents portray the response of service providers to their unique sexuality issues as people living with HIV	52 IDIs with 9 men and 43 women	IDI	Drawn from 20 to 67 year old asymptomatic and critically ill respondent categories; women formed a majority no based on deliberate choice but clientele of the organizations providing community based HIV services in the slums of Nairobi
16. [52] Swaziland	Examined the nature of sexual activity and condom use among PLWHA in Swaziland; behavioural change and safer sex and how these are influenced by HIV-positive status	37 IDI and 5 FGD. 25 women, 12 men	IDI and FGD	Adult HIV-positive individuals, caregivers and service providers in HIV-care organizations. Three respondents were community home based care providers. Participants in FGDs were all members of HIV-support groups.
17[54] Kenya	This study explored sexual activity, contraceptive	4 FGDS with 37 caregivers	FGD	(Community Health Extension Workers) CHEWs and implementation partners providing home based care in Nairobi urban squatter settlements and

	behavior and pregnancy desire among home based care HIV-positive patients by interviewing both patients and caregivers			the western province. Stratification was based on rural-urban divide and religious faith. This produced four strata with 6-8 participants per FGD.
18. [55] Togo	To investigate participants' perceptions, thinking, reactions, encounters following HIV diagnosis in addition to sexual behaviour. This was in order to comprehend factors that motivate and inform these behaviours	88 IDIs	IDIs	There were fewer men compared to women (32 versus 56) with mean age of 35 years. 39/88 were married. 13/56 women were widowed as against 1/32 men. Average duration of HIV diagnosis was 14 months. Most respondents were of low socioeconomic bracket with about 7 years of schooling. Monthly expenditure averaged 25,200 CFAs (550CFAs=1USD)
19. [57] MM Uganda	Sexual behaviour following HIV diagnosis. Risky sexual activity and condom use	48 IDIs, 24 men and 24 women	IDI	Inquiries regarding sexual activity in the preceding three months were done among stratified respondents of quantitative study based on current sexual activity (active/inactive), consistent condom use (consistent/inconsistent) and disclosure of status (disclosed/not disclosed) to most recent sex partner. This gave 6 categories of respondents. Four each of men and women were interviewed in each category.
20. [62] MM Nigeria	Sexual behaviour of HIV-positive men and women	2 FGDs separately for men and women	FGD	PLWHA (men and women) receiving treatment at a teaching hospital antiretroviral centre

IDI=In-depth interviews, KII=Key informant interviews, FGD=Focus group discussion

3.3.10 Quality of studies

Quantitative studies

About a third of the studies (17/47) were low risk [35,37,39,40,47,48,52,55,70,73,77,81,82,88,89,95,96], (*n*=26/47) were moderate risk [33,34,38,41,46,49-51,53,57,59,61,62,64,66,68,69,76,78,80,85,90-94] while the remaining three studies were high risk for bias [43,65,79].

Although quantitative studies addressed focused research questions and used appropriate designs, there was considerable diversity in the quality, particularly in terms of sampling. Random or probability sampling was employed in only eight studies [34,37,42,47,48,57,81,82]. Most studies 79% (*n*=37) [33,35,38-41,43,46,49-53,55,59,61,62,64-66,68-70,73,76-80,85,88,90-95] used convenience, consecutive or other non-random sampling methods.

Participants' response rates were reported in less than two-thirds (29) of the studies [34,35,38-42,47,48,50,52,53,57,61,64,66,68,70,73,78,80,82,85,88,90,93-96]. Other limitations of the studies were reliance on questionnaires 95.7% (*n*=45/47) [33-35,37-43,46-53,57,59,61,62,64-66,68-70,73,76-80,82,85,88-96] and recruitment from health facilities 85.0% (*n*=40/47) [33,37,38,41-43,46-53,57,59,61,62,64-66,68-70,73,76-80,82,85,88,90-96].

There were also variations in time elapsed since HIV diagnosis and duration of HAART treatment. In some studies, participants had professional relationships with interviewers, hence the risk of social desirability bias [33-35,39].Variation in reference periods from one month [69] to 12 months [40,88] or since diagnosis [94] introduced measurement bias. Similarly, the definitions of risky sexual behaviour/unprotected sex were diverse. While most studies [35,39,43,51,61] limited the recall period to three months, others used one month [65] to 12 months [40,80,88].The reference period was unstated in one of the studies [53]. In addition, the assessment of condom use was not uniform. In one group of studies, it was clearly classified as 'always', 'occasional' or 'never' [35,38,40,43,49,62,68-70,76,77,81,82,90,94] while in the others [33,41,50,53] dichotomous responses were reported. Over half of the studies (28/47) had medium sample sizes (101-500 participants) [33,34,38,41,42,46,48-50,52,55,57,59,61,62,64-66,68,82,85,88,91-96] while more than a third (19/47) had large samples (≥500 participants) [35,37,39,40,43,47,51,53,69,70,73,76-81,89,90].

A few other studies had small sample sizes [52,66,91].The third quality issue was the limited proportion of men in some samples. Men constituted less than one third of the respondents in a substantial proportion 43% (20/47) of studies [33,35,37,39,49,51,53,57,59,61,65,69,70,76,77,79,80,90,91,93] and none of the studies exclusively recruited men.

Measures of fertility desire were clearly defined in fifteen studies [34,37,46,48,52,55,56,62,64,81,82,85,92,93,95] with a further seven offering in addition various definitions of fertility intention [33,42,49,55,64,85,93]. Only four studies provided validity and reliability measures for the tools deployed [48,81,82,85].

Most studies recognized the confounding effects of socio-demographic variables on sexual and reproductive behaviour. Although cross-tabulations and Pearson's chi-square, McNemar's test, log likelihood test or Fisher's exact tests were used as appropriate to obtain relevant p-values to address the role of chance at bivariate level, there was failure to adjust for major confounding factors using multivariate logistic regression in some studies [37,41,46,94].Similarly, possible interactions and effect modifications were ignored in these studies. Nonetheless, those that conducted multivariate analysis reported crude and adjusted odds ratios together with 95% confidence intervals.

Most studies 92% (43/47) were conducted among health facility attendees [33-35,37-42,46-53,57,61,62,64-66,68-70,73,76-80,82,85,88-96]. Only five were population-based studies [35,39,40,55,81]. Therefore findings could only be generalized to PLWHAs attending health centers. There were threats to external validity in some studies [59,60] as a result of unique study populations (e.g. couples with specific sero-status) [60] and gross under-representation of male participants [59].

Qualitative studies

Quality assessment in qualitative studies has remained highly contested. However, using recognised criteria [27] studies rated as better quality (*n*=12) gave in-depth account of the qualitative design and analysis methods used [54,58,60,71,75,79,81,83,84,86,87,89].The relatively poor quality of some studies was directly attributable to the quality of their reporting [33,56,72,94] or to the use of proxy respondents [47]. Nevertheless, even poor-quality studies could potentially offer useful insights, so a decision was made not to exclude any studies based on quality alone. All but one study which interviewed health care workers as proxy performed well for applicability [47]. Four studies were classified as high risk [47,56,72,94] two were medium risk [87,94] while fourteen were classified as low risk for bias [36,37,45,54,58,60,71,75,79,81,83,84,86,89].

Each study provided a clear statement of the research aim and employed an appropriate design. Most studies used stratified purposive sampling to recruit interviewees and

discussants that yielded maximum variation in experiences. The data collection methods were clearly described as in-depth interviews (IDIs), Focus Group Discussions (FGDs), observations or ethnography or a combination of these methods of qualitative enquiry. The weakest areas of quality were data analysis and reflexivity. All studies provided an adequate report of ethical issues. Sufficiently rigorous data analysis was identified in sixteen studies [36,37,45,54,58,60,71,75,79,81,83,84,86,87,89,95] with others providing a limited description [33,47,94]. Similarly, only nine qualitative studies provided a critical examination of the relationship between the researcher and participants [36,45,58,71,79,83,84,87,89].

Mixed methods studies

Using the appropriate checklist [28], four of the eight mixed methods studies reviewed [37,79,81,89] were adjudged as low risk, two were of moderate risk [47,95] while the remaining two were categorized as being at high risk of bias [33,94].

Four of the mixed methods studies explicitly referred to using a mixed methods design [33,47,81,95].Two others indicated the use of 'quantitative and qualitative' methods [79,89], whilst the remaining two were only identified as such based on appraisal of their methodology, where a combination of quantitative and qualitative methods were employed without highlighting the rationale and advantages of employing such mixed methods [37,94]. A clear description of the specific mixed methods research design employed was provided by only four of the eight studies [33,47,81,95].With respect to the reporting of the quantitative and qualitative results, all eight studies presented the findings in combination, or in sequence with reference to the first set of results [33,37,47,77,81,89,94,95]. Finally, the strengths and weaknesses of mixed methods research per se were partially addressed by only one study, which highlighted the value of collecting qualitative data to contextualize the quantitative findings [81].

Overall, in terms of quality, although there were areas of weaknesses, particularly in terms of sampling in quantitative studies and rigor of analysis in qualitative studies, most included studies provided evidence that could enhance understanding of the sexual and reproductive behaviour of HIV-positive African men.

3.3.11 Data Synthesis

Sexual behaviour

Outcomes

The sexual and reproductive outcomes of the quantitative studies are shown in Appendix 11-14 (p.377)

Sexual activity after HIV-diagnosis

The proportion of HIV-positive men who were sexually active in the 22 studies reporting this outcome [35,39,40,49-51,59,61,62,68,69,73,76,77,80-82,88,90,91,93,94] ranged from 16% in Uganda [51] to 92.2% in Togo [61] (median;70.8%). Geographically, this figure was highest in West African countries compared to other regions. An analysis over time showed a range from 31.8% [62] to 90% [73] (median; 71.0%) in earlier studies (2004-2008) and 16% [51] to 92.2% [61] (median; 66.5%) in more recent studies conducted from (2009-2014) ($p>0.05$).

Changes in sexual activity among African men following HIV diagnosis

Many studies found evidence of changes in behaviour following a diagnosis of HIV. For instance, there was a deliberate reduction of number of sex partners among HIV-positive men in Uganda [89]. Also, in Togo, four distinct behavioural groups emerged: the abstinent, consistent, occasional and non-condom users [87]. In Tanzania, while men considered "sex as a source of happiness and caring", HIV forced them to change their perception of a "real man" from the "macho sex conqueror" to a "faithful caring man" [36]. Furthermore, in Kenya, HIV-positive men maintained secrecy and their pre-morbid identity or disclosed their status and acquired a new identity incorporating HIV and ART. The chosen trajectory had tremendous influence on their sexual and reproductive behaviour [81].Those who adopted a new identity pursued safer sexual practices, while those who remained in denial engaged in unsafe sex, ignoring the risk to others [81].

Reasons for diminished sexual activity

Motives for sexual behaviour change revolved around four main themes in Uganda [79] and Togo [87]. These include diminished libido [89], loss of interest [79], fragile health, stress and energy expenditure associated with sexual intercourse [79].This was illustrated by one respondent thus:

"Whenever I would have sex and… I am supposed to go and work. I feel very weak… So…(having sex) affects someone's life more compared to someone who is abstaining (HIV-positive disclosed man) [89].

Another important reason was the fear of infecting their partners or getting re-infected with super strains of the virus [79,87], as stated by this respondent:

"*The one you expect not to have it [the virus] will have it and you just get another one [new virus] ...I also haven't got that energy yet.*" [HIV-positive man, 3 months on ART] [79].

A 38 year old Togolese man also said:

"*I don't have sex anymore because I am afraid I will infect my wife. If I have to die, I would rather die alone and leave my wife and child healthy. That way, my wife would take care of my child instead of both of us being killed by this virus and leaving the child orphan*." [87].

For others, behavioural change was a result of anger. They considered abstinence as a form of penance, retribution or self-punishment for acquiring HIV through the sexual route [83,89]. Others were simply following the advice of health workers against engaging in sex [76]. In the words of a 41 old widower responding to the question: 'What else did the doctor tell you to leave (i.e. stop doing?)'. He said:

"*Casual love affairs and if I have to have sex, I must use a condom. But I don't bother with that (sex) altogether because I told myself there is nothing I am going to benefit from it at the end of the day. I now don't bother with women at all….*"[76].

Perceived effect of ART on men's sexual lives

Within three months of commencing ART, most men remembered the tough lessons and challenges HIV posed to their lives. Therefore, the majority still avoided sexual intimacy. Of those who engaged in sex, some considered partner testing as imperative, they became more discerning and emphasized consistent condom use. In contrast, others engaged in sexual relations without disclosure to partners [79]. At six months, some men were still abstinent while others had resumed sex. However, men who had children in the latter group were anxious about impregnating their spouses out of fear of bearing HIV-infected children, in view of the burden they would leave their relatives with after death. Many participants indicated a remarkable improvement in libido with ART treatment [79] as described by this participant:

"*I am regaining the desire for sex unlike before, when I had no interest in having it...that shows my health is improving. It is not like before when I had lost appetite and I couldn't eat anything*." [HIV-positive man, 6 months on ART] [79].

Unprotected sex

Nineteen studies reported the prevalence of unprotected sexual intercourse [39,40,43,51,61,62,65,66,68,70,73,76,77,80,81,88,90,93,94]. It ranged from 16.2% in south west Uganda [51] to 83% in a national survey in the same country [40] (median; 24.4%). The numbers were highest in studies from East Africa compared to other regions. The prevalence ranged from 16% to 83% (median; 35.0%) in the early phase of ART in Africa (2004-2008) compared to lower proportions of 9.9% to 36.9% (median; 18.0%) in more recent (2009-2014) studies.

Sero-discordance and disclosure

The proportion of HIV-positive men with sero-discordant partners reported in five studies [40,59,73,76,93] ranged from 14.8% in Ghana [59] to 50% in Cape Town, South Africa (median: 27.8%). Also, figures for HIV-positive men with partners of unknown status reported in four studies [59,73,76,93] ranged from 15.5% in South Africa [76] to 64% in Nigeria [93]. Discordance rates were higher in West African studies [41,46,64,75,93,94] compared to studies conducted in other parts of Africa. Furthermore, the disclosure rates among HIV-positive men reported in eight studies [39,49,59,66,73,76,81,93] ranged from 40% in Cape Town, South Africa to 71.4% in rural Uganda [39] (median; 62.9%). The reported disclosure rates were higher in East African studies compared to those conducted in other parts of the continent. Disclosure rates ranged from 40% to 66.9% (median; 62.5%) in the early phase (2004-2008) of ART availability as against (34.6% to 71.0%) (median; 63.2%) more recently (2009-2014) ($p>0.05$) [76].The major reasons for non-disclosure reported from rural South Africa included ‘being afraid of negative reactions’, ‘fear of discrimination’, ‘concerns about confidentiality’ and ‘not ready just yet’ [72].

Motivation for risk reduction

A Kenyan study [71] identified fear of symptom relapse as the main motivation for sexual behaviour change. Reducing the number of sexual partners was seen as the first choice, since this decision was possible at the individual level. Condom use was perceived as more difficult, as it required negotiation after disclosure to female partners. Of concern was the fact that some cultural expectations were not supportive of risk-reduction strategies. For instance, married couples were reported to be less likely to use condoms as that would prevent the much desired pregnancy. In addition, cultural norms regarding masculinity in some places encourage multiple sex partners within or outside marriage.

Condom use

The proportion of HIV-positive men reporting condom use at last sex was discussed in six studies [40,49,52,59,81,91], and ranged from 17% in Uganda [40] to 73% in Kenya [81] (median: 60%). Similarly, reported consistent condom use among HIV-positive African men [43,50,81,82] ranged from 49% in Uganda [82] to 87% in Botswana [50] (median: 63.1%). Conversely, the proportion of HIV-positive men [40,43,94] who had never used condoms ranged from 8.2% in Nigeria [94] to 67% in Uganda [40] (median; 56.2%). Reported condom use rates were generally higher in East and South African studies compared to those conducted in West Africa or other regions. Condom use ranged from 17% [40] to 61% [52] (median; 45.7%) in the first half of the review period (2004-2008) compared to 78.2% [43] to 91.8% [94] (median; 80.7%) more recently (2009-2014) ($p<0.05$). Stating why he used condoms, a 37 year old Togolese man said:

"I had sex with three prostitutes and my girlfriend since diagnosis two years ago. I have always used condoms because I don't want to be re-infected. However, none of the women know of my serostatus because I am afraid they would not want me if I tell them [87].

Reasons for condom non-use

Those that did not use condoms gave several reasons in different parts of Africa. These included 'trust that partners are not infected" (49%) [40], spouse/partner doesn't like it' (25.1%, 33%, 36.8%) [41,43,81], 'it reduces sexual pleasure' (17.7%, 12.5%) to 'personal dislike' (4.9%, 17%) [41,43]. Others either indicated that 'their partner was already HIV positive' (24.3%), 'they desire to have a child' (18.1%) or that 'they were unaware of the need to use condoms after sero-conversion' (9.7%) [43]. Furthermore, 'being drunk' (5.7%), 'unavailability of condom' (3.4%, 8%), 'religious' injunction (3.4%), 'partner being on ART already' and 'use of another family planning method' (3%) were the reasons proffered by some [43,81]. Still, others 'felt it was not necessary' (11%), 'wanted to be intimate' (18%) or 'did not even think of it' (15%) [81].

In-depth interviews among non-condom using sero-discordant couples in Togo [56] showed that feelings of love and intimacy produced a sense of denial, which then became a justification for practicing unsafe sex. The authors reported that some respondents did not believe that condoms should be used in a steady relationship such as a marriage, as illustrated here:

"She has been my wife all this time. I can't use condoms with her, because she is my wife."[56].

Another 25 year-old HIV-positive man reported what happened during a 'moment of madness':

"Sometimes during intimate moments, in the heat of emotions, she (his wife) removes the condoms and says that she is not afraid." [87].

Some spouses even questioned the accuracy of the HIV test and did not believe that either they or their partner actually had HIV/AIDS. The following extract illustrates this point:

"*My wife is sero-negative. Thus, she does not believe that I am HIV positive. She questions the accuracy of my test results and doubts the result. Consequently, she insists on having sex with me without using condoms"* [HIV-positive man] [87].

3.3.12 Factors associated with sexual activity

Socio-demographic factors

Findings from studies in South Africa [77] and Kenya [81] showed that older HIV-positive men were less likely to be sexually active than their younger counterparts. In the Kenyan study, the adjusted odds ratio (aOR) were 3.11(1.01-9.54) and 3.65 (1.17-11.40) among 30-39 year-olds and 40-49 year olds, respectively, relative to those that were ≥50 years of age. In South Africa, the aOR for men over 40 years of age was 0.31 (0.27-0.36) relative to younger men [77]. In addition, the South African study reported that urban residence aOR=1.97(1.71-2.26) and being married or living with a partner aOR=4.42(3.85-5.08) increased the likelihood of sexual activity [77].

ART and health related factors

A study among Cameroonian HIV-positive men found that being on ART for longer periods increased the likelihood of being sexually active aOR (95%CI)=1.30 (1.17-1.46) [62]. Another study in the same country showed that dependence on others for daily activities decreased the chance of being sexually active aOR=0.59 (0.50-0.71) [77].

Factors associated with risky sexual behaviour

Studies reported a range of socio-demographic and HIV-related factors associated with unprotected sex and condom use among HIV-positive heterosexual men in African countries.

3.3.13 Factors associated with unprotected sex

Socio-demographic factors

Across Africa, there have been consistent reports of increased risk of unprotected sex among HIV-positive men compared to HIV-positive women [65,68,70,73,77,81,90] with aOR (95%CI) ranging from 1.7 (1.1-2.7) in South Africa [90] to 2.41 (1.28-4.52) in Kenya [81]. Similarly two South African studies [65,77] report that younger HIV-positive men were more likely to engage in unprotected sex than older men with aOR (95%CI) = 1.25 (1.03-1.53) in one of the studies [77]. Furthermore, married HIV-positive men were less likely to have unprotected sex [68,70,77] with aOR ranging from 1.27 (1.1-1.46) [77] in South Africa to 4.4 in Kenya [70]. In addition, high educational status reduced the risk of unprotected sex [61,81,90] with aOR ranging from 0.24 (0.07-0.80) in Kenya [81] to 0.4 (0.2-0.8) in South Africa [90]. Three studies also reported alcohol consumption as a risk factor for unprotected sex [61,65,90] with aOR ranging from 3.6 in Togo [61] to 5.9 (1.8-26.1) in South Africa [90]. In addition, urban residence was protective, aOR (95%CI) =0.7 (0.58-0.85) while presence of sexually transmitted infections (STI) symptoms increased the likelihood of unprotected sex, aOR (95%CI) = 1.35 (1.20-1.53) [77].

HIV-related factors

Disclosure of HIV-positive status [68,73,81] reduced the chances of unprotected sex in Mozambique with aOR of (0.32) [68]. Conversely in South Africa, non-disclosure increased the risk of unprotected sex six-fold [73]. Similarly, non-adherence to ART increased the risk of engaging in unprotected sex with aOR of 0.5 (0.2-0.8) [90] to 2.6 in Togo [61]. Also, higher perceived stigma aOR (95%CI) = 1.2 (1.1-1.3) [90], higher CD4 count 2.6 (1.1-6.1) [90] and shorter duration of HIV diagnosis 1.2 (1.01-1.41) [91] have all been associated with unsafe sex. In contrast being on ART aOR (95%CI) = 0.20 (0.14-0.29) [77] and its duration [61] were found to reduce the occurrence of unprotected sex.

3.3.14 Factors associated with condom use

Six studies identified factors associated with condom use [53,59,62,70,81,91].

Socio-demographic factors

HIV-positive men in the age groups 30-39 [81] and 35-44 years were more likely to use condoms, with aOR (95%CI) ranging from 2.33 in Kenya [81] to 3.3 (1.2-9.3) in Ghana [59] relative to younger HIV-positive men. Also, there was a more than two-fold increase in condom use among divorced or widowed men aOR (95%CI) =2.47 (1.34-5.27) [59]

compared to married men. Another study reports a more than two-fold increase in the likelihood of consistent condom use among unmarried HIV-positive men compared to their married counterparts (aOR=2.20) [81]. Furthermore, having at least secondary education increased the chance of condom use nearly three-fold aOR (95%CI) = 2.9 (1.2-7.8) [53,59] relative to those without formal education.

HIV-related factors

Consistent disclosure to partners makes condom use more likely aOR 2.60 [81] and increased the chance by 70% in another study [59]. Conversely, ignorance of partner sero-status and shorter duration of infection [91] were associated with condom non-use [91]. Furthermore, ART users and its use for ≥19 months increased the likelihood of condom use by aOR (1.80) and aOR (95%CI) =0.33(0.12-0.88) [70] respectively.

3.3.15 Reproductive behaviour

Outcomes

Studies reported reproductive behaviour outcomes among HIV-positive men in terms of fertility desire and/or fertility intention. They also identified HIV-treatment related and socio-demographic influences on these outcomes.

Fertility desire and intention

The proportion of HIV-positive men desirous of more children ranged from 8.5% in Uganda [35] to 61% in Nigeria [93] (median: 48.7%). The highest proportions were reported in studies from West Africa, while the lowest were from East African and South African studies. The desire for fatherhood ranged from 27% [57] to 57% 42] (median; 54.0%) in the early phase of ART availability in Africa (2004-2008) as against 37.9% to 49.71% (median; 40.7%) more recently (2009-2014) ($p>0.05$).

Fertility intention was reported by only three studies [42,46,64] with the proportion ranging from 22.4% in Ethiopia [47] to 39% in South Africa [42] (median; 28.6%).

Fertility desire and attitude towards biological children

In-depth interviews report a consensus on the perceived need to have at least one biological child among HIV-positive African men. In a mixed methods study in Ethiopia, HIV-positive men were generally desirous of biological children [37] while in South Africa this was modulated by a set of circumstances, including personal factors, intimate partner relations

and social factors. Personal desires, family and societal expectations were important, often outweighing HIV status in favor of having biological children as illustrated in the extract below. A man said he had a child from a previous marriage but did not have any with his current wife and stated that he needed one badly:

"I want to have children with my wife, and I want to have them at all costs."[56].

HIV-positive men indicated that a child ''brings hope and happiness'' and gives them a ''reason to live''. For some, having children also signified a return to ''normalcy''. There was also the desire for individuals to 'leave something of themselves' behind after they died as succinctly put here:

''I would be pleased to have children knowing that after I'm gone there will be something I leave behind."(HIV-positive man) [56].

For some men in South Africa, HIV infection and imminent mortality did not act as deterrents to having a child, but rather conferred increased urgency on attaining reproductive goals [54]. In contrast, community pressures existed for HIV-positive men not to reproduce, as reflected here:

"They [in the community] believe these men (HIV-positive) are going to die and leave women with children to struggle alone". So, many do not understand the notion of dying men wanting to have children." (HIV-positive man) [37].

Another deterrent to childbearing, voiced by HIV-positive men, was the fear of transmitting the infection to the partner and infant:

"I would also put her health and life at risk because she would be infected with HIV/AIDS in the process of trying to conceive" (HIV-positive man) [37].

HAART and fertility desire/intention

A study conducted in Zimbabwe found that HAART not only transformed the physical state of respondents, but also transformed what had been fertility desire into intention for many [60].The impact, however, has not been uniform. Some respondents still desired to have a child but were not yet convinced about the efficacy of HAART in preventing vertical transmission and were terrified of transmitting the virus to their unborn child [60].

3.3.16 Factors associated with fertility desire/intention

Thirteen studies identified factors associated with fertility behaviour [33,42,47-49,52,55,57,64,81,85,92,93].These factors include age, sex, existing children, marital/relationship status, income and religion.

Age and Gender

In eight studies conducted across Africa, older HIV-positive men were less likely to desire more children than their younger counterparts [48,49,52,57,64,81,85,96].These studies were mostly conducted in Uganda with aORs (95%CI) ranging from 0.55 (0.43-0.71) to 0.89 (0.81-0.97) [48,49,52,57] and South Africa aOR 0.94 (0.88–0.99) [96]. Conversely, a study reported an increased desire to stop childbearing among older HIV-positive men [aOR 1.13 (1.06-1.22)] [48]. In contrast, two studies each from Ethiopia [33,47] and South Africa [42,95] and one from Tanzania did not find age to be a significant factor.

Considering the effect of gender, two studies in Uganda [52,57] showed that women are less likely than men to want more children following HIV diagnosis (aOR = 0.12; 95% CI: 0.08–0.20) [57]. Being male increased the likelihood of wanting more children threefold (aOR 3.01 (1.10-8.22) [52]. In addition, the adjusted relative chance of wanting more children were 1.78(1.15-2.74) and (aOR = 2.58; 95% CI: 1.29–5.08) among HIV-positive men in Ethiopia [47] and South Africa [95], respectively. To summarise, regardless of the location in Africa, a common finding is that men continue to desire fatherhood after HIV diagnosis.

Existing children

Eight studies reported that the number of living children predicted levels of fertility desire among HIV-positive men [33,52,55,64,81,85,92,93]. In South Africa, Uganda and Tanzania, HIV-positive men with at least one living child were less likely to desire more children with aOR (0.32; 95% CI: 0.15–0.69) [95], aOR =0.56 (0.39-0.80) [52] respectively. Also, a higher number of living children served as a deterrent among these men in Uganda (aOR=1.62 (1.3-2.03) [48]. However, the number of existing children had no effect on men's reproductive desire in three studies from South Africa [42,95,96], two from Uganda [48,49] and one study from Ethiopia [47].

Knowledge of ART efficacy and perceived PMTCT Program effectiveness

Many studies indicated that the perceived effectiveness of PMTCT and ART efficacy enhanced the fertility desire of HIV-positive men [45]. For instance, men enrolled on ART

soon became interested in fatherhood [74]. Also, HIV-positive men who knew the positive effects of PMTCT on infant health wanted to have children [45]. The duration of ART was also important. This is illustrated in South Africa, where HIV-positive men on ART for 12 months or more had three-fold likelihood to desire to have children compared to those who had been on ART for shorter periods (aOR = 3.52; 95% CI: 1.44–8.60) [95]. Furthermore, two Ethiopian studies showed that awareness of efficacy of ART aOR=3.7 (1.2-11.7) [33] and effectiveness of PMTCT aOR=2.26 (1.44-3.54) [47] increased the desire for fatherhood. However, this was not the case in a study conducted in Uganda [57].

Subjective Health

A study in Tanzania investigated the effect of perceived or subjective health on fertility desire of men. HIV-positive men who felt healthier were more desirous of having children aOR=2.1(1.0-4.4) compared to those who did not feel well [55].

Spousal Influences

Apart from individual characteristics, marital status and perceived spousal desire for children also had profound influences on reproductive desire among HIV-positive men. Simply having a sexual partner increased the chance of fertility desire more than four-fold aOR 4.3 (1.2-8.7) [55], as child-bearing was viewed as a means of strengthening relationships with spouses or partners. In addition, a partner's perceived desire for children (or more children) was itself a strong motivation for HIV-positive men to procreate [33,47,85,92].The aOR ranged from 24 (9.2-105.4) [33] to 38.7 (16.7-89.1) in Ethiopia [85]. Also, marital status was a significant determinant of fertility desire in studies from Tanzania [55] and Ethiopia [85] with aOR of 2.5(1.2-3.5) and 3.4 (2.1-5.6) respectively.

Other predictors of fertility desire

Other important predictors of fertility desire were income [47,52,81] with aOR (95%CI) of 2.19 (1.01-4.76) in Kenya [81] and 2.29 (1.23-4.26) in Ethiopia [47], duration of diagnosis (aOR(95%CI) of 2.4 (1.2-4.8) [64,93], disclosure aOR(95%CI)=9.8 (1.2-7.7) [55,64] and CD4 count aOR(95%CI)=1.7(1.1-4.3) [55]. Predictors reported in single studies include informal dwelling aOR (95%CI) =2.38 (1.21-4.67) [42], religion and partner's serostatus aOR (95%CI) =2.3 (1.4-4.9) [93] and 6.25 (2.63-14.9) [48] respectively and social support aOR (95%CI) =1.59 (1.08-2.34) [81]. In contrast, loss of a child to HIV/AIDS aOR (95%CI) =0.48(0.26-0.88) [49] and discussing contraceptives with health care workers decreased fertility desire substantially aOR (95%CI) =0.3(0.1-1.0) [33]. However, wanting to use

contraceptives in the future increased the likelihood of fertility desire more than four-fold aOR (95%CI)=4.35 (1.61-11.73) [33]. Paradoxically in Uganda, believing that HIV-positive women should have children decreased fertility desire aOR (95%CI) =0.23(0.16-0.36) [57], as did being of non-Mutooro ethnic group aOR (95%CI) =3.2(1.39-7.35) [48]. In contrast, being a salaried/professional worker in the same study increased the likelihood of fertility desire with aOR (95%CI) =1.79(1.04-3.09).

3.4 Discussion

The findings presented above demonstrate that the remarkable improvement in quality of life of PLWHA, as a result of increased access to antiretroviral treatment, is associated with a rekindled interest in their sexual and fertility behaviour. This finding is particularly striking in Africa, considering the high disease burden, unique cultural characteristics and pre-morbid fertility preferences [97].This systematic review focused on heterosexual HIV-positive African men who, despite enormous decision-making powers and vital roles in the spread of HIV, are often ignored by policy-makers.

3.4.1 Principal findings

The proportion of sexually active HIV-positive men varied widely across Africa (16% to 92.2%) (Median: 70.8%) [39,51,61,62,79].This remained consistent over the period of the review. Most infected men reduced both the number of their sexual partners and their coital frequency. Shortly after diagnosis, four behavioural patterns emerged; the abstinent, consistent, occasional and non-condom users [87]. Motivation for altered sexual behaviour included: diminished libido, fragile health, fear of infecting partners, offspring or self with more virulent strains [79]. In some contexts, men's perception of masculinity changed from 'the macho sex conqueror' to a more 'caring faithful man' [36].

Diminished post-diagnosis sexual activity among African men concurs with earlier African [13] and global reports [13-17].The previous African review among both sexes discovered higher abstinence rates among men and women receiving antiretroviral drugs [13].This process of 'de-sexualization' is by no means unique to HIV/AIDS. The deleterious effects of chronic diseases on sexual functioning are well-recognized [98]. Apart from malaise and substantial energy expenditure required during coitus, HIV/AIDS could have an additional psychological effect in that those affected consider abstinence as a form of penance for

acquiring HIV infection through the sexual route [83,89]. In addition, abstinence has been consistently reported as a primary preventive strategy [13-17].

The range of figures reported for unprotected intercourse among HIV-positive African men (16.2% to 83%) (Median: 24.4%) was higher than global review figures (9% to 56%) (Median: 33%) [14]. Although, the reported prevalence of unprotected sex was higher in the early phase of the availability of ART, whether this is an indication of a trend towards safer sex remains to be ascertained. In addition, the disclosure rates among African men (40% to 71.4%) (median: 54.3%) were in agreement with figures from studies that included women [13,99].The disclosure rates were however, lower than those quoted in global reviews. In contrast, consistent condom use among HIV-positive African men was much lower than the numbers among HAART-using Africans of both sexes (71%) [13], among those with sero-negative or untested sexual partners (59% to 82%) [99] and among those with sero-positive partners (58% to 74%) [40].The disclosure rates are also far lower than global figures [14-17].While higher discordance rates were reported in West African studies, disclosure rates were lower than in East African reports. This paradox could reflect variations in culture, timing and intensity of HIV/AIDS interventions in these regions. The disclosure pattern was consistent over the period of the review. Condom use was higher in the later period of the review.

The African situation is worrisome in view of the high sero-discordance rates. Apart from variations in methods, the high risk sexual behaviour pattern of African HIV-positive men could be due to a number of factors; while most men move from their original (pre-HIV) identity to a new self-identity, incorporating both HIV and antiretroviral treatment (ART) into their lives, a substantial proportion remained in denial, rejecting this new reality. These varied trajectories had tremendous influence on the sexual and reproductive behaviour of those affected. Those persons who incorporated HIV/AIDS into their identity pursued safer sexual and reproductive lives, while those in denial practiced risky sexual behaviour [81]. Secondly, some aspects of certain African cultures are in conflict with risk-reduction strategies. While for unmarried HIV-positive men abstinence requires only self-motivation, condom use on the other hand requires disclosure and strong negotiation skills. Fear of stigma means that some of these men would rather expose their partners to the risk of infection than disclose their status and use condoms consistently.

The situation is more daunting for married HIV-positive African men, for whom prolonged abstinence is inimical to the continued existence of the marriage and condom use is considered alien [100]. In addition, many African men view condoms as unnatural, interfering with sensation and sexual satisfaction, thereby precipitating marital disharmony [101]. Most importantly, considering the child-bearing desires of most couples, condoms are seen as an obstacle to achieving their reproductive goals. Furthermore, the unsupportive attitude of some health care workers, and the lack of access to safe conception technologies, combine to deny couples the opportunity of a satisfying sex life and the fulfillment of their reproductive desires [102].The findings of this review have important implications for sexual health planning, services and research. Health authorities need to engage PLWHA communities and work with them in a culturally sensitive manner to implement strategies for addressing their specific sexual and reproductive health needs, while preventing the spread of the infection.

Age and marital status are natural drivers of sexual activity; therefore their effects on sexual activity are hardly surprising. Similarly, the initial shock, the psychological trauma following the HIV-positive diagnosis, the effects of chronic debilitating disease and the energy requirements for coitus could all explain abstinence. In contrast, the renewed hope, rejuvenation and improved clinical status associated with ART access could support resumption of sexual activity. The positive influence of ART on sexual activity was reported in both quantitative and qualitative studies in this review. This effect was consistent over the period of the review.

The finding that young, single and less well-educated men are more likely than older men to engage in risky sexual behaviour is not entirely unexpected. Without a spouse or a regular sexual partner, this group tends to be opportunistic, adventurous and more inclined to take risks. Alcohol use further impairs judgement. Therefore, young men, in particular, need to be engaged in developing youth-friendly and culturally acceptable strategies to curb the spread of the epidemic on the African continent. The influences of non-adherence to ART, denial, and higher perceived stigma on sexual and fertility behaviour are understandable as these parameters could be a reflection of personal comportment. Individuals who accept their situation and cooperate with health workers are more likely to avoid risky behaviour and vice versa. The association between higher CD4 count and risky behaviour could be a reflection of contempt and dis-inhibition. Persons with higher CD4 counts are likely to be less symptomatic and more likely to feel healthier, which may lead to complacency as highlighted

previously 13].The proportion of HIV-positive men desirous of more children (8.5% to 61%) (Median: 48.7%) and those intending to be fathers in the short term (22.4% to 39%) (Median: 28.6%) is consistent with previous reviews (Kaye et al., 2013) but lower than the figures in the general populace [103]. It is also higher than global review figures [15-17].The motivations for procreation were largely found to be similar to those of the general populace: partner preference, lineage, securing relationships, pressure from relatives, fulfillment and income [103]. However, some were specific to PLWHA, such as the desire to replace a child lost to HIV/AIDS [48].This is understandable, considering the premium placed on biological children in Africa [103]. Further, the inhibiting effects of fear of infecting others and consequences of orphan hood have been mentioned in earlier reviews [13-17]. HIV-positive men are not exempt from cultural practices of early marriage, polygyny and preference for male children. They may also anticipate depending more on their offspring for support if they reach old age. These factors put pressure on individuals and couples to produce as many children as possible [104].The important modulating effects of these cultural factors on sexual and reproductive behaviour have been stressed earlier [15].Therefore, any intervention that ignores their effects is unlikely to succeed.

3.4.2 Quality/Strengths and limitations of the review

The triangulation of evidence using recommended systematic review guidelines [20,23,28] provided comprehensive insight into the post-diagnosis sexual and reproductive behaviour of HIV-positive African men. Although every effort was made to ensure transparency, I am not oblivious of the effects of my perspectives when aggregating and interpreting these findings. Nonetheless, the diverse experiences of the reviewer and continuous dialogue with the supervising team provided the necessary checks and balances that guarded against framing the analyses according to a single researcher's perspective.

The limitations of this study should be noted. Firstly, sex remains a taboo subject in Africa; therefore self-reported sexual behaviour may not necessarily be accurate as a result of social desirability bias. Secondly, limiting our search to English literature exposed the review to language bias. Fortunately, most journals published in Francophone African countries provide English language abstracts. Thirdly, most primary studies were hospital-based. Although this is unavoidable considering the persistence of stigma, it could introduce selection bias. Therefore, generalization of the findings should be considered with caution, as the findings are likely to reflect the behaviour of HIV-positive African men enrolled on ART

in urban health facilities, rather than those of rural populations with lower access to ART. Finally, the use of narrative synthesis rather than meta-analysis restricted the pooling of quantitative outcomes. Narrative synthesis was considered the most appropriate technique, given the range of designs and outcomes in the quantitative studies and the mix of quantitative and qualitative data. Nonetheless, the harmony between quantitative and qualitative findings in the included studies is reassuring: it suggests that the review captures the main essence of the sexual and reproductive lives of HIV-positive men receiving ART in Africa.

3.5 Conclusion and Implications for further research

Evidence from this review indicates that as HAART has become increasingly available in many African countries, and as HIV-positive men have regained health and returned to their productive lives, most of them have resumed sexual activity. Some have done so unsafely. HIV-positive men also report reducing their numbers of sexual partners and coital frequency. However, some still have multiple sexual partners, acquire new partners and rarely use condoms. Some also fail to use contraception and desire to continue to have children, regardless of the risk. Experience with ART appear to bring about renewed optimism among HIV-positive men about the future, including about the potential for sexual and reproductive choices, and for some men, the ART context also leads them to underestimate risks or are unable to counteract cultural pressures that make disclosure and risk-reduction difficult. In order to gain a clearer picture, standardization of indicators and outcome measures is essential in future research. This will ensure the comparability of findings between studies and over time. There are also geographic lacunae where studies on men's sexual and reproductive behaviour have not been conducted. Studies among men and women were concentrated in East and Southern Africa while studies focusing exclusively on heterosexual men were non-existent. Also, the proportion of men in some samples was low. Further research is necessary to close the existing gaps and inform policies and programs aimed at halting the spread of this infection in Africa.

Chapter 4 Methodology

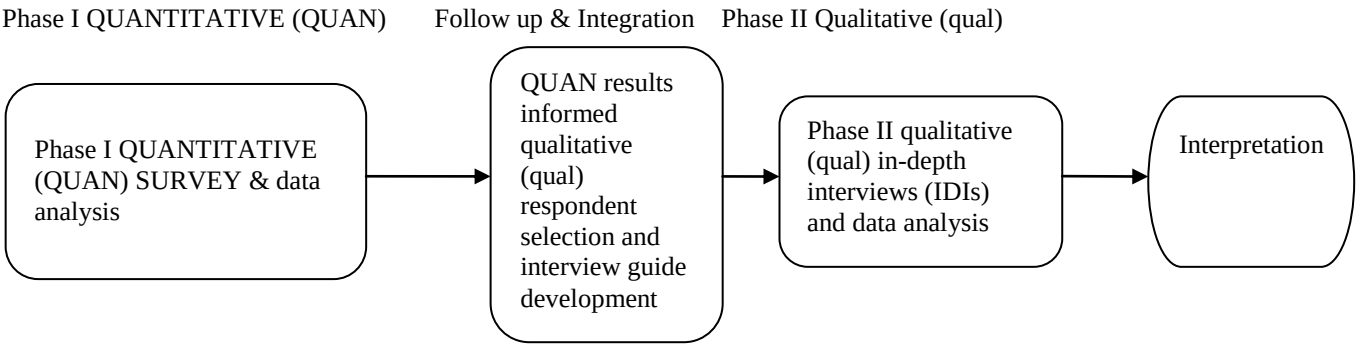
4.1. Introduction

The planning and conduct of this study is described in this chapter starting with a description of the study design, its rationale and evolution. This is followed by the study site, study population and sampling methods. Thereafter, an account of the data collection, management and analysis are given. At each stage, the strategies for mixing or integration of quantitative and qualitative research techniques are provided. The section is concluded with a description of the ethical processes and a reflection on the researcher's position in the whole research process.

4.2 Study design-Mixed methods

This study employed a sequential, explanatory, mixed methods design in two phases: quantitative survey followed by qualitative inquiry (Creswell & Plano-Clark, 2003). The first phase entailed the collection and analysis of quantitative (numeric) data while in the second phase qualitative (text) data was collected to explain the quantitative data collected in the first phase. This sequence could also be represented in contemporary mixed methods literature as QUAN → qual illustrating the dominance of the quantitative phase (Palinkas et al., 2011) as depicted in Figure 4.1. The qualitative data explained the statistical results by exploring participants' views in more depth (Creswell & Plano-Clark, 2003).

Figure 4.1 Outline of the study depicting the dominance, sequence and integration of the quantitative and qualitative phases



Source: Adapted from Creswell and Plano-Clark, 2011

4.2.1 Definition and rationale for mixed methods

The definition of mixed methods study evolved from:

"research that includes at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither type of method is inherently linked to any particular inquiry paradigm" (Greene, Caracelli and Graham, 1989, p.256) to "the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration" (Johnson, Onwuegbuzie and Turner, 2007, p.123).

The major change was a shift in emphasis from mixing research techniques and disentanglement of philosophical view point to integration throughout the research process. The essence of mixing the methods is to achieve synergy where the product or 'yield' is more than the sum of the constituent methods (Barbour and Kitzinger, 1999; Bryman, 2007; Woolley, 2009). The combined conduct of quantitative and qualitative research methods provides more insight and answers beyond the capabilities of each of the methods (Greene, Caracelli and Graham, 1989). In this study, the reasons for choosing a mixed methods design were several. First, development, where the findings from the quantitative survey in the first phase informed the sampled categories and the content of the interview guide in the second phase. Second, complementarity, in which case the data collected through the quantitative survey was elaborated or clarified by providing context and insight into the personal experiences of participants through qualitative interviews. Other reasons are the enhanced confidence, comprehensiveness and opportunity to hear the voices of the group (Greene, Caracelli and Graham, 1989; O'Cathain and Thomas, 2006). In essence, the qualitative component provided more nuanced description of the sexual and reproductive experiences of HIV-positive men in northern Nigeria, from their unique perspectives.

4.2.2 Evolution of mixed methods research

Up to the 1970s, positivist views dominated the research landscape. They held sway in the paradigm debates and randomised control trials were considered the *sine qua non* of research achieving the ultimate epistemic level. It was not until the 1980s, considered the golden era of qualitative research that constructivist-interpretivist views gained prominence and became well rooted. The mixed methods movement only emerged as a distinct third community of practice quite recently (Tashakkori and Teddlie, 1998). Nevertheless, it has already carved a niche of its own with a unique paradigm, followers and journals. Popularised by a group of renowned researchers, the mixed methods provide a middle philosophical stance from the

two extremes (Tashakkori and Teddlie, 2003; Bryman, 2007; Creswell, 2007). Its origin has been traced to a multi-trait, multi-method study conducted in psychology by Campbell and Frisk in 1959 (Creswell, 2007). Its philosophical basis, methodological foundations and standard of practice was established in the early 1990s and has flourished since then (Tashakkori and Teddlie, 2010).

Mixed methods studies integrate quantitative surveys with qualitative inquiry thereby providing synergistic benefits far above the additive effects of the two components (Creswell, Fetters & Ivankova, 2004). It is a clear departure from the restrictions and boundaries imposed by the use of one method. Its appearance on the scene was however, not without controversy. It contributed to the raging paradigm wars between methodological purists (Johnson and Onwuegbuzie, 2004). It faced severe criticism from these extreme camps who posited that quantitative and qualitative methodologies had distinct paradigms and could not be mixed-the so called incompatibility thesis (Howe, 1988; Cherryholmes, 1988). This position, they argued was informed by the irreconcilable epistemological differences underpinning qualitative and quantitative research thought. They posited that one is based on inductive reasoning while the other is deductive. However, some researchers disagreed and considered that such a hard stance exaggerates the differences between the two approaches and urged the adoption of a third pragmatic paradigm for the new mixed methods movement (Bryman, 2007; Johnson and Onwuegbuzie, 2004). This new paradigm provided safe haven for the moderates who emphasized that when indicated, the mixed methods design has merits facilitating the discovery of what and how things work in the real world rather than being engrossed in intellectual tussles (Cherryholmes, 1992).

Paradigm is a philosophical or ideological stance, a system of beliefs or values about the nature of the world, knowledge and reality (Greene, Caracelli and Graham, 1989). It also determines the assumptive base from which knowledge is produced by shaping the research focus, methods and interpretation (Rubin and Rubin, 2005). Thomas Kuhn proposed the term and viewed changes in scientific thought as a series of paradigm shifts across a broad spectrum (Hairston, 1982). He opined that the process involved an evolution which led to the replacement of earlier belief systems. He was also of the view that the newer sets of beliefs are incompatible with preceding value systems. At one end of the spectrum is logical positivism popularised by French philosopher August Comte (Yu, 2006). This paradigm posits that truth is represented by measurable, naturally occurring phenomena. It asserts that

measurement is proof of existence, so if a phenomenon cannot be measured (quantitatively that is), then it does not exist (Giddens, 1987). This extreme philosophical position evolved into a softer but still rigorous post-positivist era (Reichardt & Rallis, 1994). This hypothesizes that truth is discoverable by strict adherence to objectivity, standardized procedures with controls and use of deductive reasoning (Yu, 2006). The gold standard for this era was the randomized controlled trials. Internal and external validity, objectivity and reliability were considered the hallmarks of validity. The major strengths of the post-positivist view were precise measurements, ability to generalize and replicate findings reliably (Shadish, Cook & Campbell, 2002). However, from a philosophical perspective, the idea that one is able to observe and identify one true objective reality has been considered dubious, particularly when studying socio-behavioural phenomena, due to its inherent complexity, dynamism and its unbounded nature. Furthermore, this is complicated by the common knowledge that the research process right from its conceptualization, coinage of the research question, its operationalization, data collection, analysis and report writing are influenced to some extent by the world views, pre-conceptions and cognitive stance of the researcher. These limitations of the post-positivist camps are addressed by the opposite camp-the constructivist/interpretivist (Patton, 2002).

Those who subscribe to constructivist/interpretivist philosophy argue that social phenomena and their meanings are socially constructed by and between the persons who experience it (Gergen, 1999). It is shaped by unique socio-cultural, political and historical context within which the event occurs. Therefore, according to this viewpoint reality could be different for each person based on their unique understandings and experience (Berger & Luckman, 1966). A paradigm is mainly philosophical in nature with its ontological (study of the nature of reality: one or multiple, objective or socially constructed), epistemological (study of nature of knowledge: independent of participants or mutually created through interaction) and axiological (study of value-ethics and aesthetics) characteristics by specifying the use of inductive or deductive techniques. A researcher's paradigm determines the framing of his research questions, the methodology, methods of data collection and interpretation (Tashakkori and Teddlie, 1998). Although this researcher came from a clinical, quantitative, post-positivist background, he considers this paradigm too restrictive to answer all the research questions posed in this study. Particularly, the exploration of the perspectives of HIV positive men, and their interpretation of the social phenomena related to their sexual and reproductive lives. This will not be adequately addressed using quantitative empirical data

alone. Therefore, he adopted different assumptions within each phase-that is a post-positivist stance in the quantitative phase and a constructivist/interpretivist view in the qualitative explanatory phase while maintaining a pragmatic paradigm overall. This links the choice of approach directly to the nature of the research questions which often don't fit snugly into quantitative or qualitative designs (Creswell & Plano-Clark, 2007). Therefore, the work focuses on answering the research questions and unveiling reality in order to improve practice.

The choice of the dominant research method and the best sequence was based on the research questions (Tashakkori and Teddlie, 2003). A quantitative dominant, sequential explanatory mixed methods study was best suited for addressing the research questions in this study for several reasons. First, the study sets out to describe 'what is' the sexual behaviour and reproductive behaviour of HIV-positive men, whether changes occurred from pre-morbid behaviour and compare them with matched controls (research questions 1,2 and 4). The quantitative survey component of the mixed methods answered these questions to a large extent. Qualitative interviews provided explanations and context as to 'why' changes occur, 'how' HIV-positive men in northern Nigeria interpret their situation with regards to marriage and fatherhood (research questions 3 and 5) and how the health care service responded (research question 6). Furthermore, (research questions 1 and 2) required in-depth qualitative interviews to provide explanations to the quantitative findings in order to be comprehensively answered. Therefore, the component studies were not just sequential, but interconnected, as the findings of the quantitative phase informed the design of the qualitative interviews. Similarly, the findings of the qualitative interviews complemented those of the quantitative study.

4.2.3 Integration of component methods

A mixed methods study requires a seamless integration of its constituent methods in its conceptualization, design, data collection, analysis and the drawing of integrated inferences (Tashakkori, 2009). Thus, it is expected that mixing should occur at the point of design, data collection, analyses, and at the point of interpretation. This holistic integration of the methods and findings from the component studies are critical. It provides the distinction between real mixed methods studies and the mere conduct of parallel unrelated multiple studies. Researchers have indicated that achieving integration is not easy (Woolley, 2009; Bazeley, 2009). A well-integrated mixed methods study justifies the choice of the method in the first place. Integration of a mixed methods study is determined by the extent to which constituent

methods are explicitly related in such a way that they illuminate each other from the formulation of research questions to the interpretation of findings (Bryman, 2007; Laub and Sampson, 2004). Guidance has been offered for the smooth blending of the methods from conceptualization, study implementation, data analysis and interpretation and writing up (Woolley, 2009; Bazeley, 2009). Specifically, Yin proposed an integration framework at five levels, namely: integration at the (i) level of the research questions, (ii) the units of analysis, (iii) structure of the samples, (iv) study instruments and data collection and (v) analysis and interpretation. The extent to which the mixed methods study integrates at these levels determines whether a mixed methods study took place (Wolley, 2009; Yin, 2006). This framework was used to describe the strategies for achieving integration.

4.3. Stage One: Planning for the mixed methods study

The challenges associated with planning and successful implementation of mixed methods studies are well known (Molina-Azorín, 2011). It requires more time and resources compared to each of the component methods. In addition, it demands a wide range of skills that are usually not found in one researcher. This is partly due to the hang over effect of the evolution of research paradigms. Scientists depending on whether they are in the social sciences or in the more quantitative inclined medical sciences tend to have only one set of skills. The multi-tasking requirements of mixed methods studies require additional researcher training to enhance the missing skills (Tashakkori and Teddlie, 2003; Molina-Azorín, 2011). In the case of this researcher, qualitative research skills were deficient. Therefore adequate skill acquisition, preparation and planning were necessary to undertake this mixed methods study. The preparatory steps included the formation of the research questions and conceptualization of the research based on the existing gaps in literature. This was followed by skills acquisition. The next two sub-sections describe how these were achieved.

4.3.1 Formulation of the research questions

The research questions strictly determined the choice of research methods employed in this study. It informed the selection of the study design, data collection techniques and methods of analysis (Gilbert, 2008; Bryman, 2007). As earlier explained, the very nature of the research questions that resulted from the review of existing literature required a blend of quantitative and qualitative methods to be adequately tackled. It was not a case of a series of mutually exclusive questions that independently required either a quantitative or qualitative method.

Rather, some research questions required a complement of both methods to be answered satisfactorily (Woolley, 2009; Creswell, 2003). For instance, (research questions 1, 2 and 4), required mainly quantification of measures of (sexual activity, coital frequency, consistent condom use etc.) and reproductive behaviour (proportion that desired more children, those that intend to have children within 3 years). Research questions 1 and 2 required in addition, qualitative exploration of considerations, motivations and context within which choices about sexual partnerships and procreation occurred. Furthermore, research questions 3, 5 and 6 required mainly qualitative inquiry to determine the reasons for change in behaviour, men's interpretation of their situation with respect to marriage, fatherhood and assessing the health care service response.

4.3.2. Skills enhancement

Even though the researcher had a medical degree, clinical experience in obstetrics and gynaecology, a master of public health degree and two clinical fellowships, he was conscious of his mainly quantitative exposure and therefore undertook skills enhancement programmes through formal courses and capacity building workshops in qualitative research methods and use of Nvivo software. In addition, he honed his quantitative skills further through regression courses using SPSS and STATA, systematic review and medical ethics.

4.4. Stage two: Units of analysis

Yin's integrative framework requires that the unit of analysis be the same in each constituent method, especially where the two methods were used to provide clarity to aspects of the same research question(s). In this study, the units of analysis in the quantitative survey and qualitative interviews were HIV-positive men. A sub-sample of participants in the quantitative survey was interviewed in the second phase to explore their motivations and reasons for their sexual and reproductive behaviour following diagnosis. Thus, the qualitative phase illuminated specific aspects of the research questions partly answered by the quantitative survey (Yin, 2006; Woolley, 2009). In addition, interviews with health workers provided their perspectives on the response of the health care service to the sexual and reproductive health needs of HIV-positive men and their partners.

4.4.1 Context and Study site

Located in north west Nigeria, Kano state had an estimated population of 11,215,688 people (NPC, 2007). It is the most populous state in northern Nigeria. Of the projected figures, 2,305,984 were men, 2,467,451 were women of child bearing age (15-49 years), 2,175,458 were children under the age of five years while infants constituted 453,092 respectively. The inhabitants of Kano are predominantly Hausa, Fulani Muslims. However, there are substantial proportions of other Nigerian tribes and a Christian minority. The state is made up of 44 local government areas, eight of which are urban and the rest rural.

The HIV sentinel surveys conducted in Kano state as part of national studies reported prevalence of 4.3% in 1999 and a slightly lower value of 4.1% in 2003. Subsequent surveys showed a drop to 2.2% in 2008 which later rose to 3.4% in 2010. The most recent 2012 NARHS returned a much lower figure of 1.4% as against a national prevalence of 3.4% from the same survey. An earlier HIV integrated biological and behavioural surveillance survey (FMOH, 2010) among most at risk groups reported HIV prevalence of 49.1% among brothel based commercial sex workers (CSWs), 44.1% among non-brothel based CSWs, 11.7% among men who had sex with men, 10.1% among intravenous drug users and 4.4% among the police (4.4%). Uniformed armed personnel had a prevalence of 3.7% while 1.4% was found among long distance transport workers.

Though the state's HIV prevalence has been lower than the national figures, its high population and estimated 374,000 people living with HIV/AIDS, out of which only 106,000 are diagnosed and registered in one of the health facilities providing ARV services. Similarly, with a high fertility rate (TFR of 6 per woman), the state makes a significant contribution to the mother to child transmission burden in Nigeria. With an estimated 19,067 pregnant HIV-positive women projected from 560,784 pregnant women and HIV prevalence of 3.4% in 2010, potentially a third of the babies born would be HIV-positive in the absence of PMTCT interventions. Therefore, the state could contribute 6,355 HIV children to the Nigerian national pool of infected children, some of whom would be orphans.

The study was conducted at the S S Wali HIV treatment centre located within Aminu Kano Teaching Hospital (AKTH) (Figure 4.2, p.109). The hospital established in 1988 is a 500-bed tertiary hospital. The centre began offering HIV treatment services in 2004. At the time of the study (June, 2014), 2,498 HIV-positive men, 4,887 HIV-positive women and 384 HIV-positive children were on follow up at the clinic. Apart from this Centre, HIV diagnosis,

treatment, care and support services were offered in selected primary health care centres, secondary health centres including Murtala Muhammad Hospital that registered 997 men, 2,351 women and 306 children, while the Infectious Diseases Hospital had 2,396 men and 3,457 women. Other health facilities providing ART services in the state include Muhammad Abdullahi Wase hospital which catered for 401 men, 187 women and 5 children, while Hasiya Bayero hospital had 218 men, 682 women and 275 children on their register.

At S S Wali centre, a multidisciplinary team provides specialist care five days a week to these patients. Clinical examinations, laboratory investigations and antiretroviral drugs are provided free of charge. In addition, there are counselling and testing services, home-based care and patient support groups. Apart from the provision of antiretroviral treatment and other supportive care, non-eligible patients are encouraged to live positively through safe sex, adequate nutrition, exercise and maintaining a positive outlook. Majority of the patients come from within Kano, but a substantial number are from neighbouring states. Patients are either directly referred from voluntary counselling and testing centres or from several clinics within the hospital. Others are referred from private hospitals or other health care facilities across the state. HIV status is determined using two rapid tests in parallel or enzyme-linked immunosorbent assay (ELISA) (FMOH, 2010). HIV test results from elsewhere are re-confirmed before placement on ART. Most patients are from the predominant Hausa-Fulani ethnic groups, with a representation of other Nigerian ethnic groups. Majority are traders, subsistence farmers, business men or civil servants (Iliyasu et al., 2011).

Figure 4.2 Map showing the study location, Kano, Nigeria

Source: From http://www.slashnews.co.uk: accessed 17th June 2013.

4.4.2. Study population

With significant levels of stigma and discrimination towards PLWHA in the study area (Iliyasu et al., 2009), it was unwise to approach respondents at home. It could lead to inadvertent disclosure to spouses, other family members or neighbours. It is on record that some PLWHA even prefer to enrol at ART centres far away from their places of abode to receive treatment *in cognito* (Iliyasu et al., 2009). Therefore, the feasibility of obtaining a community-based sampling frame for interviews was slim. To insist on this ideal could have prevented the conduct of the study altogether or yield unacceptably low response rates with no meaningful conclusions. This necessitated the use of an institutional sample keeping in mind the recognised draw-backs (Magnani, 2005).

Study population-quantitative survey

The study population for the quantitative phase included adult (18 years or older) HIV-positive men diagnosed at least 6 months prior to the study and enrolled at Aminu Kano Teaching Hospital.

4.4.3 Inclusion and Exclusion Criteria for HIV-positive men

Inclusion

1. Men, at least 18 years old
2. Documented HIV- positive
3. Have attended AKTH ART clinic at least once
4. Provide informed consent for participation

Exclusion

1. Too ill to participate in interviews

Control population-quantitative survey

Due to the recognized confounding effects of socio-demographic variables on sexual and reproductive behaviour (Iliyasu et al., 2009), one matched control was recruited from the general outpatient department of the same hospital. They were HIV- negative or untested men (≥18 years old) with ailments other than HIV infection. Matching was done for age (within 5 years), education, ethnic group and religion.

4.4.4 Inclusion and exclusion criteria for HIV negative or untested men

Inclusion criteria

1. Men, ≥ 18 years old
2. Untested for HIV or documented HIV-negative
3. Attending AKTH outpatient department for non-HIV related illness
4. Provides informed consent for participation

Exclusion criteria

1. Too ill to be interviewed
2. Previous HIV testing with unknown result

It is also recognised that due to the study setting, the respondents were likely to be more educated, well off economically and urban residents compared to those that did not access

services at this tertiary hospital. However, recruitment of controls from the general outpatient department of the same hospital meant they faced similar selection factors.

Study population-qualitative phase

A sub-population of HIV-positive men from the survey participants who provided consent for qualitative interviews constituted the study population in the second (qualitative) phase. In addition, health professionals constituting the leadership cadre (Project Director), mid-level managers (Program Manager, Matron-in-charge, Chief Counsellor) and those with purely clinical roles (Medical Officer) in the HIV/AIDS treatment centre made up another study population in this phase. This was to capture the perspectives of health care providers/health managers on sexual and reproductive behaviour of HIV-positive men and the response of the health care service in terms of staffing, organization and range of services provided (WHO, 2005). This provides the answer to one of the research questions (question 6).

4.5. Stage Three: Sampling

Yin's integrative schema requires that samples are nested within each other (Yin, 2006; Woolley, 2009). This condition was satisfied in this study by sampling the respondents for the qualitative interviews from the pool of quantitative survey participants. A stratified purposive sub-sample of survey participants was interviewed during the second phase. Here, it is important to appreciate clearly the distinction between the sequential explanatory strategy used in this study and its sequential exploratory counterpart. In the latter design, qualitative data collection and analysis (mainly for the development of concepts and tools for the second phase) precedes the quantitative phase with more weight normally placed on the qualitative inquiry. The reverse being the case in the adopted design where quantitative data was collected and analysed in the first phase, followed by qualitative interviews. The qualitative component builds on the results of the dominant quantitative survey. A cross sectional comparative survey was done in the quantitative phase using interviewer administered questionnaires. In the second phase in-depth interviews were conducted with a subset of HIV-positive men and a sample of health care providers/health managers (Table 4.1).

Table 4.1 Mixed methods study goal, strategy, samples and analysis

Strategy	Sample	Goal	Analysis
Structured interviews (HIV-positive men and controls)	Systematic sample of HIV-positive men attending ART clinic & matched controls from General Outpatient clinic	Assess sexual and reproductive behaviour & changes following HIV diagnosis and ART	Univariate, bivariate & conditional logistic regression analyses
Semi-structured interviews (IDIs) (HIV-positive men)	Stratified purposive sample of survey respondents (HIV-positive men)	Obtain explanations, experiences and unpack meanings of patterns of sexual and reproductive behaviour	Thematic framework analysis
Semi-structured interviews (IDIs) (Health care workers/managers)	Purposive sample of Health care providers/health managers	Explore the pattern of health care service response, sexual and reproductive service provision and integration into ART treatment programmes	Thematic framework analysis

The quantitative phase provided the magnitude of sexual and reproductive outcome measures for HIV-positive men and controls. It also served as a sample frame for the selection of respondents for the in-depth interviews in the second phase. The findings of this (second) phase explained and provided context to the numeric results. The nesting of the respondents of the second phase among first phase study participants ensured that the same unit of respondents were studied in the two phases fulfilling one of the requirements of Yin's framework (Yin, 2006). Similarly the questioning line in the in-depth interview benefitted from the quantitative phase as follow up questions were designed to understand the behaviour and perspectives of HIV-positive men. The sample size and sampling strategy are now described for each phase.

4.5.1. Quantitative (survey) respondents in the first phase

Sample size determination

The sample size was determined using the formula for two proportions (Magnani, 1997), fertility desire of 61.2% (Iliyasu et al., 2009) and 73% (NPC, 2009) previously reported among HIV positive men and controls, respectively. Type I error of 5% and power of 80% were used, with a mark up of 10% to account for non-response.

$$n = [(Z_{\alpha} + Z_{1-\beta})^2 * (p_1 (1 - p_1) + p_2 (1 - p_2)) /(p_2 - p_1)^2]$$

Where,

n = minimum sample size required per group

p_1 = the estimated proportion of HIV-negative or untested men desirous of more children. From the 2008 NDHS, (73% of men surveyed (15-59 years) planned to have another child sooner or later) (NPC, 2009)

p_2 = the estimated proportion of HIV-positive men that are desirous of more children (61.2%) (Iliyasu et al., 2009). Therefore, the quantity (p_2 - p_1) represents the expected difference in proportion.

Z_α = the Z-score corresponding to the degree of confidence with which it is desired to conclude that an observed difference (p_2 -p_1) would not have occurred by chance (α-the level of statistical significance), and

$Z_{1-\beta}$ = the Z-score corresponding to the degree of confidence of detecting a difference in size of (p_2 - p_1), if it actually exists (β-statistical power). At 80%, this corresponds to 0.84 from a normal distribution table.

Substituting the values in the formula

$n = [(Z_\alpha + Z_{1-\beta})^2 * (p_1 (1 - p_1) + p_2 (1 - p_2)) /(p_2 - p_1)^2]$

$n= [(1.96+0.84)^2 * (0.73(1-0.73) + 0.612(1-0.612))/(0.73-0.612)^2]$

n=244.8

n=245 per group

Increasing the sample size by 10% as earlier justified gives a total of (245+24.5=269.5). Hence 270 participants were recruited in each of the study (HIV-positive men) and control (HIV- negative or undiagnosed men) groups.

Recruitment and sampling of HIV positive men at S S Wali Centre

As HIV-positive male patients arrived at the male reception area of S S Wali HIV Treatment centre, they were registered serially by a health records clerk and allocated to a consultation room. While waiting for their turn to be seen by the clinician, a trained health worker informed them about the study, its objectives, what it entailed and the fact that participation was voluntary. Those whose serial number tallied with the systematic sampling process were invited to a separate room after their clinical consultation and provided more detailed information about the study. Prospective participants were told that they are being asked to take part in research, participation was voluntary and withholding consent would in no way affect the services they received at the centre. Their questions were answered and understanding of the study information checked before obtaining informed consent. Excluded

from the study were those that were too sick to be interviewed. Over the course of the study 7 patients were excluded as a result of severe diarrhoea (4 patients) and high fever (3 patients) requiring hospitalization. All sampled patients that were approached agreed to participate in the study.

To ensure quality, each interviewer (the researcher and the two assistants) conducted not more than five interviews per day. The systematic sampling method was used. The clinic attendance register constituted the sampling frame. The sampling interval was determined by dividing the expected attendance by the day's sample size. The first respondent was identified using a random number between one and the sampling interval. Subsequently, the sampling interval was added to respondents' serial number to identify the next interviewee. For the comparison group, the clinic attendance register at the male general outpatient department was used to sequentially match attendees (in 5 year age groups and by education, ethnicity and religion) with interviewed HIV-positive men.

Selection of controls at General Outpatient Department

As patients arrived the male section of the General Outpatient Department of Aminu Kano Teaching Hospital, they were welcomed by the health records clerk, who registered them serially, inquired and recorded their main symptoms. He then allocated them to a consultation room. While waiting for their turn, a trained health worker informed them of the study, its purpose and the fact that they were requested to participate in research if they fulfilled certain criteria. In addition, he informed them that participation was voluntary with no consequences for withholding consent or withdrawing it after commencement of interviews. The research assistant compared the socio-demographic characteristics (age, education, religion, tribe) of the registered patients (as recorded in the register) with earlier interviewed HIV-positive patients at S S Wali centre sequentially. The first patient whose parameters tallied with the HIV-positive patient was recruited as control. He was invited to a separate room after the consultation. He was provided with detailed information about the study and asked in private about previous HIV testing whether or not he received the results. Furthermore, he asked about history of chronic cough, significant weight loss, oral thrush, night sweats, chronic diarrhoea, persistent fever, enlarged lymph nodes, diagnosis of tuberculosis or skin lesions suggestive of Kaposi's sarcoma. Informed consent was obtained after checking understanding and answering any questions that the patient had. Interviews where then conducted in the private room.

4.5.2. Sample selection for Qualitative (Phase two) interviews

In-depth interviews with HIV-positive men

Sample size

Although 'data saturation' (the point at which the researcher was no longer hearing new information) has been recommended for qualitative studies (Mason, 2010), interviewing a sub-sample of 22 survey participants was considered adequate to produce rich, detailed and valid data that could explain the quantitative results.

Sampling

In fulfilment of one of Yin's integrative strategies, samples were purposively selected for in-depth interviews based on the range of experiences discovered during the survey phase (Table 4.2). This was done to achieve maximum variation in opinions from diverse perspectives (Farmer, 2006).This illuminated the quantitative results by providing context within which such varied sexual and reproductive behaviours occurred. Guidance for such a selection has been provided (Ivankova, Creswell, & Stick, 2006). The choice being between typical and unusual cases (outliers) to enhance the capture of diverse experiences. Typical and deviant cases were recruited in the following categories using stratified purposive sampling method (Coyne, 1997):

Selection of respondents for in depth interviews

At the end of the survey interviews, participants were asked if they were willing to be contacted during subsequent clinic visit for in depth interviews to provide more insight into their sexual and reproductive behaviour following HIV-positive diagnosis, if they happen to fulfil certain criteria that would emerge from the analysis of the survey data. The hospital number and contact details of willing potential participants were noted. Nearly all survey respondents were willing except for a few (9 of the survey respondents) that indicated non-availability due to work (3), long appointment time (2), travels (3) or other engagements (1). After analysing the questionnaire data, the following criteria (marital status, type of marriage-monogamous or polygamous, sexual activity, fertility desire and sero-concordance) were used to group survey respondents into five categories. Depending on complexity of the category, at least two respondents were purposively selected after this stratification. This was to provide maximum variation of respondents across the sample and within each category (See Table 4.2). All interviewees were members of support groups.

Table 4.2 Stratified purposive sampling matrix

Criteria for selection	Category	Recruitment target
Marital status & sexual activity	Single, sexually active	≥ 2
	Single, sexually abstinent	≥ 2
Type of marriage	Monogamous	≥ 2
	Polygamous	≥ 2
Marital status & condom use	Single, condom using	≥ 2
	Single, non-condom using	≥ 2
	Married, condom using	≥ 2
	Married, non-condom using	≥ 2
Fertility desire	Desire more children	≥ 2
	Doesn't desire more children	≥ 2
Serodiscordance	Serodiscordant	≥ 2
Total		≥ 22

This resulted in 22 interviews conducted with HIV-positive men.

4.5.3 Selection of Health workers/Health managers

In the second (qualitative phase) a purposive sample of five health workers/managers were selected based on roles and responsibilities. The project leader (Project Director), middle management cadres (Program Manager, Matron-in-charge, Chief Counsellor) and those with purely clinical roles (Medical Officer).They were interviewed to provide their perspectives on the organization and response of the health care service to the sexual and reproductive health needs of HIV-positive men and their partners. The composition of the sample is shown in Table 4.3.

Table 4.3 Characteristics of interviewed Health care workers/Health managers

Category	Title/Designation	Sex	Number interviewed
Top Management	Project Director/Senior Physician	Male	1
Middle Management	Senior Nurse/Matron in-Charge	Female	1
	Program Manager/Adherence Counsellor	Female	1
	Chief Counsellor	Female	1
Clinical role	Medical Officer	Male	1
Total			5

4.6 Stage four: Research instruments

4.6.1 Instrument for the quantitative survey

A structured interviewer-administered questionnaire was adapted from existing validated tools (Wekesa, 2013). The questions were structured to address the study objectives and conceptual framework. It consisted of the following sections: socio-demographic characteristics, HIV diagnosis and treatment history, knowledge of transmission risks and sexual and reproductive behaviour. Additionally, information about respondents' clinical and ART-related characteristics: WHO clinical stage, CD4 cell count, time since ART initiation, were retrieved from case files. For the comparison group, questions related to HIV/AIDS clinical management were skipped.

4.6.2 Measurements

Respondents who had sexual intercourse in the preceding six months were considered sexually active otherwise they were classified as abstinent. For the sexually active, coital frequency was defined as the number of times they engaged in sexual intercourse per week. Participants were also asked about condom use. This was categorized as 'never', 'sometimes' or 'always'. The reported occurrence of condomless sex and condom protected sex were

recorded. Partner HIV status was classified as ‘tested positive’, ‘tested negative’ or ‘unknown status. Respondents were also asked to recall sexual activity and condom use before testing positive for HIV. Safe sex and safe conception knowledge were assessed using an adapted validated questionnaire (Wekesa, 2013). The possible responses to the questions were “true”, "false" or “don’t know”. Reliability and internal consistency among items assessing the same outcome was assessed using Cronbach’s alpha. This indicator provides a composite measure and ranges from 0-1 with higher values denoting greater consistency. Cronbach’s alpha scores of ≥0.7 are acceptable while lower values show unacceptable inconsistency (Gliem and Gliem, 2003). Overall the scales showed good reliability with scales yielding an alpha of above 0.80.

Based on Miller’s Traits-Desires-Intentions-Behaviour framework for understanding childbearing motivations (Miller, 1994; Miller et al., 2004), reproductive desire was assessed by asking “Do you wish to have any (more) children?” with response options “Yes” or “No”. If the respondent answered “Yes”, they were asked the total number of children they desire to have. They were also asked if this has changed following discovery of their HIV-positive status. In addition, to assess reproductive intention they were asked, “Are you planning to have any (more) children in the next 3 years?” (“Yes” or “No”). Furthermore, married respondents were asked if their spouses wanted to have more children, by asking “Does your spouse want to have (more) children?” Interviews were not conducted directly with spouses. Baseline and most recent (as at the time of the study) clinical and laboratory parameters (WHO clinical stage, CD4 cell count and time since ART initiation) were also extracted from case files. However, viral load studies, important as they are were not available for most patients. Weight and height were measured using standard methods (NHF, 2007).
The questionnaire was first written in English and then translated into the local Hausa language. It was subsequently back-translated independently into English. A 10% sample was used for pretest and assessment of the psychometric properties (reliability and re-validation) of the questionnaires at the Infectious Diseases Hospital Kano. Ambiguities and skip patterns were rectified before the main study. Data from the pre-test were not included in the main study.

4.6.3 Interview guide-HIV-positive men

The interview guide had a set of semi-structured open-ended inquiries administered face to face. Responses were further probed for detailed descriptions. Informed by the research

questions, the need to clarify questionnaire responses and the conceptual framework (Crankshaw et al., 2012), the guide covered relevant aspects while remaining flexible (Appendix 5, p.366). It explored motivations for and the circumstances around the HIV test, post-test reactions, disclosure and its impact on sexual intimacy and reproductive plans.

The interview guide for health care workers and managers contained questions and prompts on responsibility, training and skills related to SRH counselling and service delivery. It also explored the current health care service organization for SRH services and health worker attitude towards ART service integration. Furthermore, the guide inquired about health care worker perceptions on sexual and reproductive behaviour of HIV-positive men, their attitude towards childbearing by these men and their partners (Appendix 6, p.369).

4.6.4 Protection of Human Subjects/Ethical considerations

The protocol was reviewed and approved by the Ethics Committee of the Aminu Kano Teaching Hospital (Appendix 7, p.372) and the University of Sheffield ethics committee (Appendix 8, p.373). Permission was also obtained from Aminu Kano Teaching hospital management and PLWHA support groups in the hospital. Potential participants were informed of the voluntary nature of the study and the fact that interviews would be confidential and that they could refuse to answer any questions they were uncomfortable with and withdraw their consent at any point without consequences on the care they receive. Respondents provided consent after receiving detailed information during each phase of the study. The consent was obtained after answering any questions potential participants had.

In line with the provisions of the Helsinki declaration (WMA, 1996), provisions were already in place for linking up respondents who experience any discomfort (physical or psychological) during or following the interviews with standard health care services. Participants were asked to report any such experiences immediately to the investigator so as to ensure access to standard care. This was achieved by making prior arrangements for referral to the relevant clinic for counselling, care and support. A case in point was a young man who described a harrowing experience in a boarding secondary school where he was sexually molested by his favourite teacher. The interview brought back unpleasant memories and psychological distress. He was referred to a clinical psychologist who counselled him and provided treatment at no cost to the respondent as promised during the consent process. This buttresses the importance of considering and making preparations for all range of possible

health risks including psychological and mental health dimensions. It is often easy to overlook such possibilities and assume that interviews and questionnaire surveys are completely harmless. It is also important to minimise the likelihood of social, economic and legal consequences by maintaining privacy and confidentiality. The latter was ensured by using pseudonyms instead of real names in reporting qualitative findings.

4.6.5 In-depth-interviews

Specifically, In-depth interviews were conducted with HIV-positive men attending S S Wali HIV treatment centre at Aminu Kano Teaching Hospital. The face to face confidential interviews explored: reasons for changes or lack (of change) in sexual and reproductive behaviour following HIV-positive diagnosis; it unpacked information about men's motivations, libido and sexual experiences since discovering their HIV-positive status. In addition, it explored their understanding and interpretation of their situation with respect to relationships, marriage and fatherhood. Furthermore, it identified barriers, opportunities and cultural influences on relationships and fertility choices. It also identified external constraints (e.g., access to appropriate health information and services) that affected men's choices about relationships and fertility. All qualitative interviews were conducted by the researcher.

4.6.6 In-depth interviews with health care providers

In-depth interviews were also conducted with five health care providers/managers (counsellors, medical doctors, nurses, project manager etc) at the S S Wali treatment centre at Aminu Kano Teaching Hospital. The interviews determined self-assessed knowledge, skills of the staff with regards to HIV-positive men's SRH issues, specifically it inquired about the workers ability to provide counselling for safe sex and safe conception for those that were desirous of childbearing and contraceptive counselling. The existing staff mix, policy and practices regarding SRH/HIV/AIDS counselling and service integration were also assessed. This provided an avenue to determine the response of the health care service and identify barriers to the SRH care among HIV-positive men.

4.6.7 Data collection process

The interviews were mainly conducted in the locally spoken Hausa language or English based on the respondent's preference. To maintain confidentiality, the interviews were conducted in designated rooms at the S S Wali HIV treatment centre and the General Out-Patient clinic. Each interview lasted for about one hour.

4.6.8 Study team

The research team included the researcher and two assistants. One of the assistants held a Higher National Diploma (HND) in Health information and works at the Department of Community Medicine, Ahmadu Bello University, Zaria while the other was a junior faculty at the Department of Community Medicine, Bayero University Kano. They were both fluent in Hausa language and experienced in the conduct of research interviews. Being men also facilitated rapport and communication about sensitive matters. They were trained intensively for five days on interview techniques, methods of sampling, confidentiality, consent and administration of structured questionnaires.

4.7 Stage five: Data Management and Analysis

4.7.1 Data Management

A password-protected database was created in SPSS version 21.0 (IBM Corporation, 2012) in consultation with the medical statistics group at the School of Health and Related Research (ScHARR), the University of Sheffield. Data were entered by the researcher at the Medical Research and Consultancy Unit (MRCU) of the Department of Community Medicine, Aminu Kano Teaching Hospital, Kano, Nigeria.

4.7.2 Data Analysis

Quantitative Data analysis:

Data cleaning was achieved by checking frequencies, sorting and cross tabulations for implausible values.

Univariate analysis

Sociodemographic and HIV related treatment variables

Descriptive statistics (mean ± standard deviation or median and range) were obtained for numeric socio-demographic (age, income and duration of marriage)and treatment related (duration of HIV diagnosis, duration on ART, BMI and CD4 count) variables while (frequencies and percentages) were used for categorical sociodemographic (education,religion, ethnicity, place of residence, occupation,marital status and type of marriage) and treatment (clinical stage, category of ART, health status, optimism and perceived discrimination) variables.

Sexual outcome variables:

The proportion of sexually active HIV-positive men and controls were those that reported penetrative vaginal intercourse in the preceding six months. Otherwise they were classified as abstinent. Coital frequency was the number of times respondent reportedly engaged in sexual intercourse per week.

To minimise the effects of re-call bias, comparison of self-reported libido, sexual activity and coital frequency were made before and after HIV-diagnosis after categorising respondents based on duration of diagnosis. Respondents were categorised as those diagnosed within the preceding year (≤1 year) and those who tested positive to HIV over a longer period (>1 year). McNemar's chi-square test was applied to test for significant changes in libido and sexual activity before and after diagnosis while Wilcoxon signed rank test was used to determine significant differences in median coital frequencies.

Condom use

Consistent condom use in the preceding 6 months was analysed as frequencies and percentages among HIV-positive men and controls. In addition, before and after (diagnosis) comparisons of consistent condom use was made among HIV-positive men. Furthermore, sub-group analysis of consistent condom use by spousal serostatus was conducted among HIV-positive men.

Risky sexual behaviour variable

Those that had multiple (>1) sexual partners and/or engaged in condomless sex and/or had serodiscordant partner or partner of unknown status in the preceding 6 months were considered to have engaged in risky sexual behaviour. These were reported as frequencies and percentages for HIV-positive men and controls. In addition, risky sexual behaviour were compared among HIV-positive men before and after diagnosis.

Reproductive outcome variables

Reproductive intention, i.e. plan to have a child in the next 3 years was presented as frequencies and percentages for HIV-positive men and controls. To determine if changes occurred following HIV diagnosis, before and after (diagnosis) comparisons of reproductive intention was made for HIV-positive men.

Bivariate analysis

To identify factors associated with sexual activity, risky sexual behaviour and reproductive intention, cross tabulations and tests of asssociation (Pearson's chi-square or Fisher exact test) were carried out between each of the three outcome variables and sociodemographic/HIV-related variables variables. In addition, significant differences in consistent condom use by spousal serostatus was determined using Pearson's chi-square test.

Risk factors for sexual activity

To identify risk factors for sexual activity, Pearson's chi-square test or Fisher's exact test was used to determine significant associations between sexual activity and socio-demographic (ethnicity, marital status, marital duration, education, age, religion, employment, number of children, reproductive intention) and HIV-related (duration of diagnosis, serodiscordance, perceived chance of HIV transmission without condoms, chance of transmission on ART, chance of transmission on PREP and possibility of sexual intercourse without HIV transmission) variables.

Factors associated with risky sexual behaviour

To determine factors associated with risky sexual behaviour, 2x2 contingency tables of sociodemographic (ethnicity, marital status, marital duration, education, age, religion, employment, number of children and reproductive intention) and HIV related (duration of diagnosis, serodiscordance, perceived chance of HIV transmission without condoms) variables were constructed with the outcome variable (risky sexual behaviour, i.e. having multiple (>1) sexual partners and/or condomless sex and/or serodiscordant partner or partner of unknown status in the preceding 6 months). Pearson's chi-square test or Fisher's exact test was used to determine significant associations as appropriate.

Factors associated with reproductive intention

Cross tabulations of socio-demographic variables (ethnicity, marital status, marital duration, education, age, religion, employment, number of children), HIV-related (duration of diagnosis, serodiscordance, perceived chance of HIV transmission without condoms, chance of transmission on ART, chance of transmission on PrEP and possibility of sexual intercourse without HIV transmission) variables were made with the outcome variable (reproductive intention, i.e. plans to have a child in the next 3 years). Pearson's chi-square test or Fisher's exact test was used to determine significant associations.

Multivariate analysis

For the multivariate analysis, binary logistic regression analysis was done in STATA version 13 (StataCorp., 2013) to identify predictors of sexual activity, risky sexual behaviour and reproductive intention. The outcome variables were converted to dichotomous variables and coded as 1 or 0 when present or absent respectively. Independent variables that were statistically suggestive (with $P<0.10$) at bivariate levels or conceptually important were included in the regression model. Wald Test with a removal level of significance of $P<0.1$ was used). Crude and adjusted Odds ratios (ORs) with 95% confidence intervals (CIs) were obtained. Hosmer-Lemeshow tests were done to determine the goodness of fit of the final models. Significance level for tests was set at $P<0.05$.

Analysis for predictors of sexual activity

Separate logistic regression models were developed to identify predictors of sexual activity for the combined dataset of HIV-positive men and controls and a separate model for HIV-positive men only. For the combined sample, factors with $P<0.10$ at bivariate level (marital status, education, age, employment, number of children, reproductive intention) were included in the model. In addition to the variables used in the combined data set, factors that were conceptually important for HIV-positive men (duration of diagnosis, perceived transmission risk and serodiscordance) and confounders (ethnicity, religion) were included in the HIV-positive men's model.

Analysis for predictors of risky sexual behaviour

A binary logistic regression model was developed to identify predictors of risky sexual behaviour using the combined dataset of HIV-positive men and controls. The independent variables with $p<0.10$ at bivariate level (marital status, education, religion, employment, number of children and reproductive intention) were included in the model. Thereafter, a separate binary logistic model was developed for HIV-positive men. It included factors that were important for HIV-positive men (perceived transmission risk and serodiscordance) and confounders (age and marital duration).

Reproductive intention

To identify predictors of reproductive behaviour two binary logistic regression models were constructed. The first model was for the combined dataset for HIV-positive men and controls. It included factors with $P<0.10$ (ethnicity, marital status, marital duration, education, age,

religion, employment, number of children) at bivariate level. In addition, the separate model for HIV-positive men included variables that were conceptually important for the group (duration of diagnosis, serodiscordance, perceived chance of HIV transmission without condoms, chance of transmission on ART, chance of transmission on PREP and possibility of sexual intercourse without HIV transmission).

4.7.3 Definition of dependent and independent variables

Variables whose occurrence or magnitude is influenced, affected or probably caused by other variables are called the dependent variables (Creswell, 2009). They are also known as outcome or response variables. In this study these include sexual activity and fertility intention (whether respondent plans to have a child within the next three years).

Independent variables also known as predictor or explanatory variables influence, affect or probably cause the dependent variable (Creswell, 2009). In this study for sexual activity they include socio-demographic characteristics (age group, marital status and employment), transmission risk perception, desire for more children and its discussion with spouse. Similarly, for fertility intention, the independent variables were age group, type of marriage (monogamous or polygamous), marital duration, number of living children, employment and transmission risk perception.

4.7.4 Qualitative Data analysis

Qualitative interviews were recorded, translated (from Hausa language) into English and transcribed verbatim. Textual data was formatted as Microsoft Word files, imported and analyzed using computer assisted qualitative data analysis (CAQDAS) (Nvivo, version 10 (QSR International Pty Ltd, 2012). The data included transcripts of audio-recordings and field notes. Analysis was performed based on the 'Framework Approach' (Pope, Ziebland and Mays, 2000). The five key stages involved in this thematic framework approach were familiarization, generating the coding frame and themes, indexing or applying the codes to the transcripts, formation of framework matrices or charting, mapping and interpretation. First, the familiarization involved the process of reading and immersion into the data to get a general feel of the material. This provided an overview of the richness, thickness, depth and diversity of the data. It involved listening to tapes, reading transcripts and studying observational notes. During this stage, the researcher read the verbatim transcripts closely while reflecting on the study purpose. He kept memos of key ideas, recurrent and emergent issues considered important to the respondents.

This was followed by the process of generating the initial codes to constitute the coding frame. This simply means assigning words or phrases that captured the key issues and concepts in the sentences and paragraphs of the interview transcripts. The initial codes were based closely on the language used by respondents and informed by the original research questions. This list was shared with the supervisors who suggested the inclusion of codes to capture issues of stigma, gender and relationships, partly in connection with the match-making examples provided by HIV-positive men and health workers. To finalise, similar items were merged.

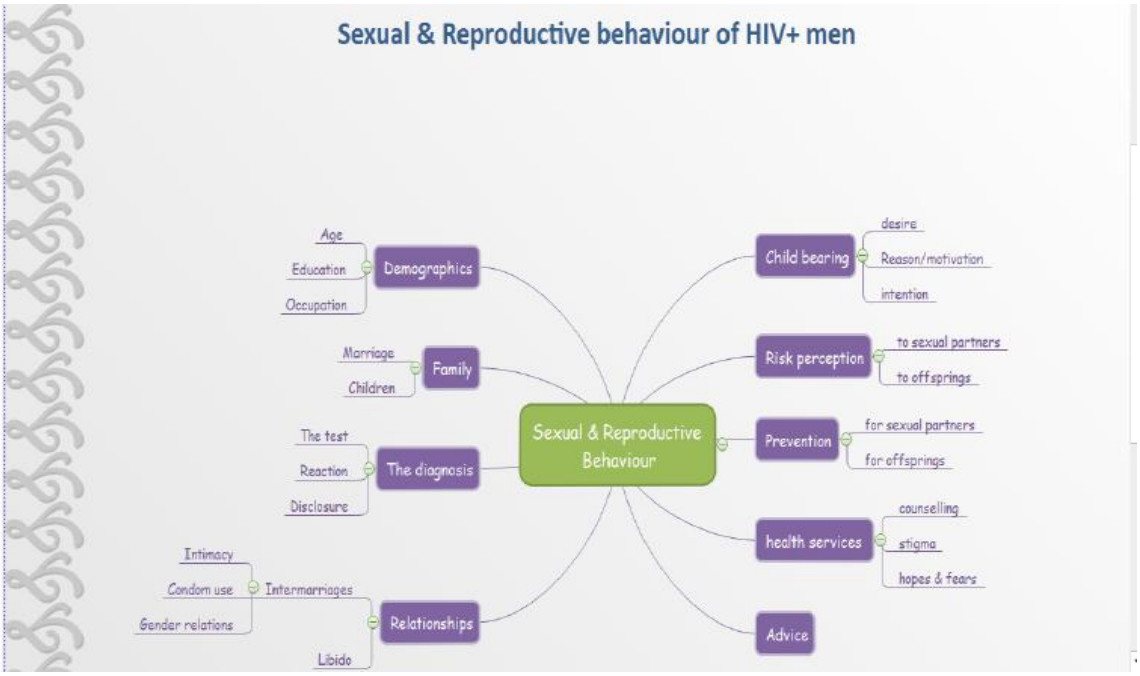
Table 4.4: Initial codes

Codes
1. Life history
2.Family
3. Marriage
4. Children
5.The diagnosis
6. The test
7. Reaction
8. Disclosure
9. Perceived source (of infection)
10. Relationships
11. Libido
12. Intermarriages
13. (Sexual) intimacy
14. Condoms
15. Gender relations
16. Childbearing wish
17. Reason(s)
18. Risk perception
19. Counselling
20. Stigma
21. Hopes and fears
22. Advice

The list of final codes were grouped to form themes representing different aspects of sexual and reproductive behaviour of HIV-positive men. A visual representation 'thematic map' of

how the codes were sorted to form themes was shared with the supervisors and finalised following discussion as shown in Figure 4.3.

Figure 4.3: Thematic map of sexual and reproductive behaviour of HIV-positive men



The codes are called nodes in Nvivo terminology (IQR International, 2012). The indexing or coding process involved the application of the coding frame to all the interview transcripts. This was achieved in Nvivo by dragging and dropping sentences, phrases or paragraphs in the relevant nodes. Nvivo maintains a traceable link to the original source thus maintaining an analysis trail and transparency.

This was followed by charting, which was achieved by constructing a framework matrix in Nvivo, where each 'cell' was automatically populated by the coded material. The coded entries in the framework cells were then summarised keeping as close as possible to the original context and retaining respondents' words as much as possible.

Mapping involved reading the range of responses under each theme for variations in accounts of sexual and reproductive behaviours of men following HIV-positive diagnosis. Similarly, individual entries across themes provided individual perspectives on aspects of sexual and reproductive behaviour. This was done by reviewing the framework matrix under each theme

and reporting the range of responses and patterns of men's reported sexual and reproductive behaviour. Specifically, consistencies, variations or differences in accounts of behaviour patterns were identified across the matrix. Narratives and illustrative quotes were extracted to capture and highlight men's voices (using words, phrases, quotes expressing experiences related to relationships, condom use, sexual life and reproductive projects following HIV-diagnosis). These findings were triangulated with quantitative results to answer the research questions as described in the next section.

4.7.5 Triangulation of results from quantitative and qualitative phases

Triangulation was originally used in land surveying and navigation to determine the position of a point with the aid of two other points (Sharp, 1943). First applied in the health and social sciences by Campbell and Fiske (1959), it is a process of studying a research question using different methods and bringing together the findings to gain a comprehensive picture (Sandelowski, 1995). The key value of a mixed methods study is the convergence of evidence far and above what could have been obtained using any of the component methods. However, Patton advised against focusing only on consistency as it is erroneous to expect total agreement between findings from different approaches or data types (Patton, 2002). The author further argues that inconsistencies may be due to the comparative advantage of the constituent methods used in a mixed methods design.

In this study, triangulation was used in addressing the major research questions in an integrated fashion rather than the sequential presentation of findings from the component methods. Findings were examined for consistency or convergence (agreement of findings from the component quantitative and qualitative methods), complementarity (addressing different aspects of the same question) and discrepancy (contradiction) (Farmer et al., 2006). The latter is important as it deepens understanding and provides leads for further studies (Fielding and Fielding, 1986).

A two-step approach to triangulation was adapted (Farmer et al., 2006). In the first step, findings related to each research question were obtained from the survey analysis and qualitative framework matrix in Nvivo. The contents were then reviewed to provide magnitude measures from the quantitative results and major themes and subthemes from qualitative data. Analytic outputs from the two methods were merged to answer the relevant research questions. The integrated findings constitute the subsequent chapters of this thesis.

In summary, using Yin's framework, integration occurred during formulation of research questions, identification of a common study unit in the survey and qualitative phases and during sampling of the second phase and development of interview guides. Furthermore, harmony was ensured in the nature of the data collected and the analytic strategy (Yin, 2006). In addition, the findings from the two phases were integrated during interpretation (Zhang and Creswell, 2013). The quantitative results from the first phase and the qualitative findings from the second phase were examined together, and written up together, in order to obtain a complete picture of the effects of HIV-positive status and ART on the sexual and reproductive lives of men. While the quantitative phase provided the numerical magnitude of the dimensions of sexual and reproductive activity and behaviour, the qualitative phase illuminated the context within which these behaviours occurred. This integrated analysis of the findings from the two phases is a key strength of a mixed methods design (Woolley, 2009).

4.8 Strengths of the study

The major strength of this study lies in its design. Being a mixed methods study, it comprehensively quantified and provided qualitative insights into the sexual and reproductive behaviour of HIV-positive men in Kano, northern Nigeria. It was also comparative, the first study of its kind in this cultural setting to compare experiences of HIV- positive men before and after HIV diagnosis and with their HIV-negative or undiagnosed contemporaries. Using other patients with non-HIV related illness attending general outpatient services in the same hospital as matched-controls provided the opportunity to assess the effect of HIV-positive status on sexual and reproductive behaviour, which will be difficult to achieve with other controls.

4.9 Limitations of the study

This study is cross-sectional and hospital based with their recognised shortcomings. Cross sectional studies are down the ladder of hierarchy as sources of evidence compared to other designs such as randomized trials, however the study design was informed by the research questions and it will be ethically unwise to contemplate deliberate allocation of individuals to groups unnaturally. Also, a community-based study would have been more representative. However, considerable stigma and discrimination is still associated with HIV/AIDS in the

study setting making it difficult to approach participants in their houses. The study was also reliant on self-report of sexual behaviour and reproductive plans. Since, no observations or objective assessments are feasible, there was some risk of social desirability bias-as people tend to report what is socially acceptable behaviour even if they don't conform (Fisher, 1993). Finally, there is need for caution when extrapolating the findings to the general population because of the role of selection factors. Patients accessing services at a tertiary health facility are more likely to be better educated, urban residents, of higher social class than those who donot. In addition, they are able to afford related costs and overcome social, cultural and geographical barriers. Therefore, the findings would be more reflective of individuals with these characteristics. Rural dwellers with lower educational attainment were under represented. The effect of this was minimised by adjusting for the other unmatched demographic factors during analysis. Caution was also exercised while interpreting the study findings. Finally, the use of male researchers eliminated the effects of gender difference which could inhibit free flow of sensitive personal information in this conservative society. Also, assurance of confidentiality through removal of identifiers from study instruments, transcripts and password protection of the database ensured confidentiality and facilitated open discussions. These strategies reduced the effects of these limitations on the study outcome.

4.10 Reflexivity

Reflexivity is the "recognition of the influence a researcher brings to the research process" (Kuper, Lingard and Levinson, 2008, p.689). It involves evaluating the potential influence of power relations and social distance between the researcher and respondents. In addition, it assesses the effects of researcher's gender, ethnicity and social status on the data collected. Furthermore, it entails sensitivity to the influence of the researcher's position, values and intellectual biases that influenced choices in the study such as the research topic, research questions and the methods of data collection (Kuper, Lingard, and Levinson, 2008; Mays and Pope, 2000). With regards to this, I now explain my positionality in this research.

First, my personal interest in this research topic arose from many years of clinical obstetric and gynaecologic practice in northern Nigeria, specifically in Kano and Zaria cities. Underlying the daunting challenges posed by high maternal mortality and morbidity was the stronghold that men had on family decisions and resource control. In every aspect of my

obstetric clinical practice (ANC, delivery and postnatal care), newborn and gynaecologic practice (infertility and STI treatment etc.), I encountered the strong influence that men had on the utilization of health services. They were powerful in matters related to sexual relationships (number, types of partners inside and outside of marriage) and family formation. They initiated and determined how frequent sexual activities occur and influenced the family size. However, they were often completely ignored by the health care providers. For instance, if a woman presented to the infertility clinic, commonly health workers asked her to bring a sample of the husband's semen for analysis without prior counselling. Secondly, in these settings, men's permission was essential for women to access family planning services. Despite these important roles that men played, programmatic and research attention has rarely focused on men.

With the advent of HIV/AIDS, its predominant heterosexual transmission in Africa and the gender dynamics in northern Nigeria, women and children are even at greater risk of acquiring the infection from men as husbands and fathers. A study of the correlates of fertility desire among PLWHA (both men and women) before the widespread availability of ARTs found that despite the gloomy prognosis of the disease at that time, a substantial proportion of HIV-positive men and women were desirous of child bearing (Iliyasu et al., 2009). I suspected that with increased access to ART, more PLWHAs could be desirous of childbearing and wondered if the men took the necessary precautions to ensure safe sex and conception in view of the power asymmetry in favour of men, peculiar cultural practices such as polygamy and societal pressure on couples to bear as many children as possible. Furthermore, I was not sure if adequate measures were taken by the health care service in ensuring safe sex and conception, especially, among HIV-serodiscordant couples, thereby curbing the spread of HIV.

Now, about the choice of study site, apart from the fact that S S Wali centre, Aminu Kano Teaching Hospital is one of the largest centres providing ART in northern Nigeria located in the most populous commercial city in northern Nigeria, the hospital is affiliated to Bayero University Kano where I have worked for over a decade. In addition, this hospital sponsored my residency training off-site at Ahmadu Bello University teaching hospital owing to lack of accreditation at the time. Although I have not been directly involved in the management of HIV patients at this site, my familiarity with those who do and the patients' perception that I could influence the care they receive might have facilitated the cooperation received during

the two phases of this research work. Respondents also considered the interviews as a rare opportunity to discuss their sexual and reproductive concerns.

The research team being composed of men removed the influence of gender difference on responses. Men at the study site were more likely to open up and talk freely about sensitive sexual matters with men rather than women. This is probably as a result of religious and cultural factors. In addition, as men, the respondents felt we understood their situation better. In addition, my personal (egalitarian) belief in the sexual and reproductive rights of all people regardless of circumstances is an important consideration. My perception that the care provided to men is sub-optimal (with consequences for the health of women and children) influenced the choice of the topic and the way the research questions were framed. Similarly, as a public health physician, my desire to improve the care of those infected with HIV while protecting the uninfected could all come to bear on the research questions, design and execution of this research work.

I don't think even a medically qualified researcher from outside the study setting would receive the level of cooperation I had from both staff and patients. Also, majority of patients must have felt as if the interview was part of their health consultation, despite explaining and stressing to each participant that this was a research project. On my part, there was a tendency to occasionally fall back on clinical history taking skills rather than the techniques of social enquiry. Sometimes, I probed as if I wanted to establish a diagnosis rather than explore motivations, lived experiences and reasons for particular behaviours. Being from the same ethnic group with the respondents, we communicated well and understood the cultural etiquette. It is still debatable if studying one's people is appropriate. The danger of not noticing things that would be quickly spotted by an outsider are ever present (Bernard, 2006). Therefore, I am aware that my social standing, gender and ethnicity could have influenced how I asked or interpreted some of the findings.

The impact of working with research assistants during the first quantitative phase to administer questionnaires to HIV-positive men and controls needs to be acknowledged. Doing otherwise would have prolonged this phase of the study. Previous experience with surveys, the intensive training, the pre-test and use of structured questionnaires facilitated the process. Furthermore, the close supervision and spot checks ensured good quality survey.

Last but not least is some reflection on data quality. The careful preparations, training of research assistants, pretesting of instruments, supportive supervision and data management ensured data quality (Collumbien et al., 2012). Validity and reliability of data was ensured in the first survey phase while the reflexivity, positionality and triangulation were important yardsticks in the second qualitative phase (Bauer and Gaskell, 2000).

4.11 Chapter Summary

This chapter presented a detailed description of how this study was conducted. It started with an overview of the study design, its rationale and evolution. This is followed by a description of the study site, study population and sampling methods. Thereafter, an account of the data collection, management and analysis are given. At each stage, the strategies for mixing or integration of quantitative and qualitative research techniques are provided.

In essence, to determine the sexual and reproductive behaviour of HIV-positive men in the era of ART, a sequential explanatory mixed methods design in two phases was employed: a quantitative survey of a facility based sample of HIV-positive men and matched controls among attendees of the same facility presenting with non-HIV related conditions. This was followed by qualitative interviews with a sub-sample of survey participants and health care workers/managers. The section is concluded with a description of the ethical processes and a reflection on the researcher's position in the whole research process.

The next chapter (the first of the four result chapters) presents the characteristics of the survey participants, circumstances of testing for HIV, initial reactions and extent of disclosure. This sets the scene for the description of the effects of HIV-positive status and its treatment on sexual and reproductive behaviour of men in subsequent chapters.

Chapter 5 Findings: Participants' Characteristics, HIV status Discovery and Disclosure

5.1 Introduction

This chapter describes the socio-demographic characteristics and clinical profile of HIV-positive men and controls. In addition, it describes the social groupings of those who participated in in-depth interviews, their circumstances, motivations for taking the HIV test and how these men reacted to a positive result. Furthermore it indicates whether or not they disclosed their HIV status to others and why. It should be noted that for the purpose of ascribing quotes from qualitative interviews (with HIV-positive men and health workers/managers) pseudonyms (not real names) were used to maintain confidentiality.

5.2 Socio-demographic characteristics of HIV-positive men and controls

Two hundred and seventy HIV-positive men and an equal number of matched controls participated in the quantitative study.

5.2.1 Age distribution

The mean age (± standard deviation, SD) of HIV-positive men and controls were similar 38.8(±8.44) versus 37.9(±8.93) respectively (P>0.05). In both groups, most men were in the fourth or fifth decades of life (Table 5.1).

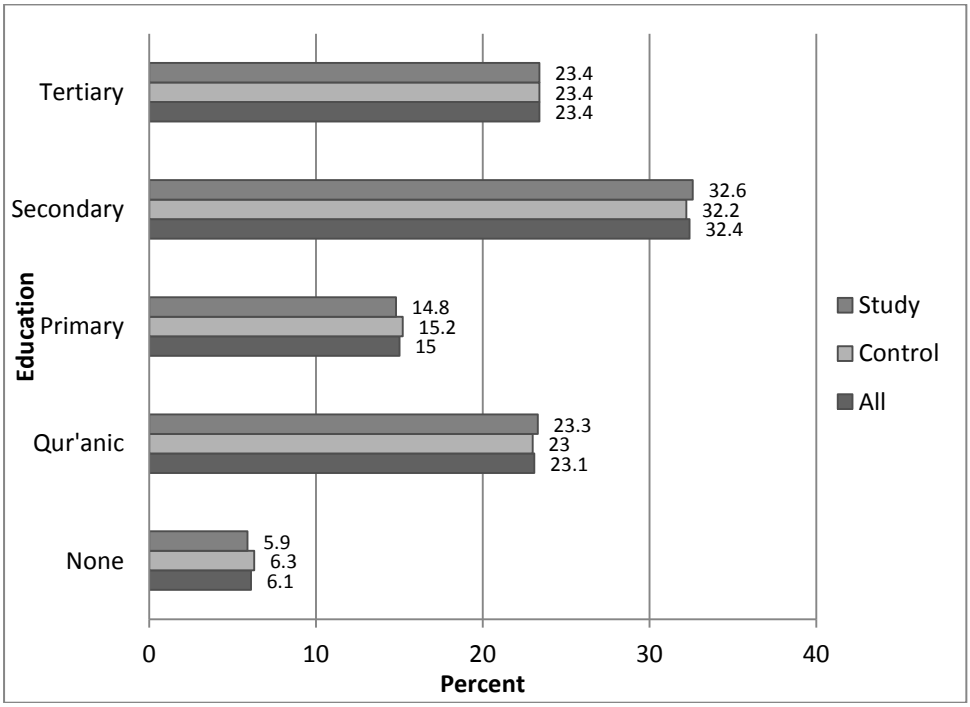
Table 5.1 Age distribution of HIV-positive men and controls

	Frequency (%)		
Age group (years)	**HIV-positive men**	**Controls**	**Total**
<25	11 (4.0)	12 (4.4)	23 (4.3)
25-29	25 (9.3)	25 (9.3)	50 (9.3)
30-34	40 (14.8)	38 (14.1)	78 (14.4)
35-39	64 (23.7)	64 (23.7)	128 (23.7)
40-44	78 (28.9)	78 (28.9)	156 (28.9)
45-49	25 (9.3)	26 (9.6)	51 (9.4)
50-54	12 (4.4)	12 (4.4)	24 (4.4)
55-59	10 (3.7)	10 (3.7)	20 (3.7)
≥60	5 (1.9)	5 (1.9)	10 (1.9)
Total	**270 (100.0)**	**270 (100.0)**	**540 (100.0)**

5.2.2 Education

In both groups, nearly a third and almost a quarter of men had secondary and tertiary education respectively. The rest of the respondents either had primary education or no formal education (*P*>0.05). (Figure 5.1).

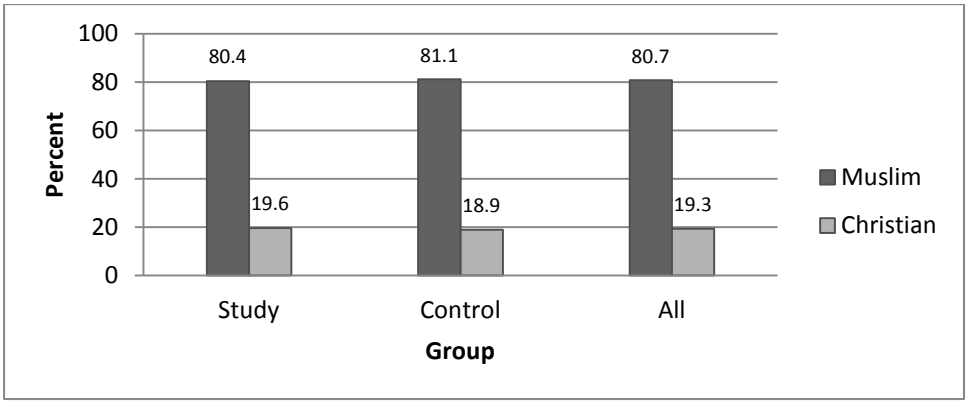
Figure 5.1 Highest educational qualifications of HIV-positive men and controls



5.2.3 Religion

The majority of HIV-positive men (80.4%) and controls (81.1%) were Muslims (P>0.05) (Figure 5.2).

Figure 5.2 Religious affiliations of HIV-positive men and controls



5.2.4 Ethnic composition

The majority of the HIV-positive men (74.1%) and controls (77.0%) were of the Hausa tribe. The rest were from other Nigerian tribes (Table 5.2).

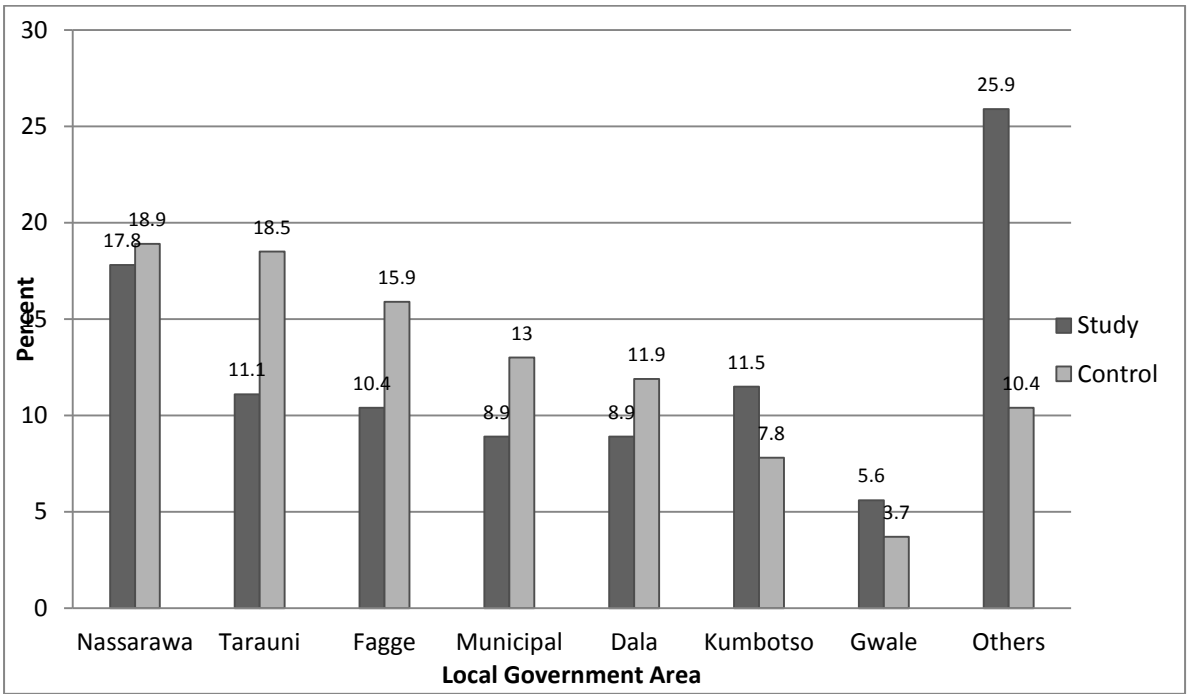
Table 5.2 Ethnic composition of HIV-positive men and controls

	Frequency (%)		
Ethnic group	**HIV-positive men**	**Controls**	**Total**
Hausa	200 (74.1)	208 (77.0)	408 (75.6)
Fulani	8 (3.0)	6 (2.2)	14 (2.6)
Igbo	30 (11.1)	28 (10.4)	58 (10.7)
Yoruba	11 (4.1)	7 (2.6)	18 (3.3)
Others	21 (7.8)	21 (7.8)	42 (7.8)
Total	**270 (100.0)**	**270 (100.0)**	**540 (100.0)**

5.2.5 Place of residence

Most men in both groups resided in urban Kano (Nassarawa, Tarauni, Fagge, Municipal, Dala, Kumbotso and Gwale local government areas). However, a higher proportion of HIV-positive men (25.9%) than controls (10.4%) lived outside Kano metropolis (P<0.05) (Figure 5.3).

Figure 5.3 Place of residence of HIV-positive men and controls



5.2.6 Occupation

More than a third of HIV-positive men (42.6%) and nearly a third of controls (31.5%) were traders. The rest were mostly civil servants, farmers or teachers. A higher proportion of controls were unemployed (14.4% versus 7.4%) (P<0.05) (Table 5.3).

Table 5.3 Main occupation of HIV-positive men and controls

	Frequency (%)		
Occupation	**HIV-positive men**	**Controls**	**Total**
Trading	115 (42.6)	85 (31.5)	200 (37.0)
Civil servant	45 (16.7)	35 (13.0)	80 (14.8)
Farming	43 (15.9)	16 (5.9)	59 (10.9)
Teaching	19 (7.0)	27 (10.0)	46 (8.5)
Driving	7 (2.6)	14 (5.2)	21 (3.9)
Others	20 (7.4)	54 (20.0)	74 (13.7)
Total	**270 (100.0)**	**270 (100.0)**	**540 (100.0)**

The occupational categories were by no means homogeneous. For instance, ‘traders’ range from rich educated merchants engaged in large businesses to petty traders including a mix of

people working at or close to subsistence level. Similarly, civil servants consisted of clerks, administrative officers or directors and chief executives. Further, subsistence farmers and mechanised farmers made up the category 'farmers'. It is therefore difficult to rank the categories except by average monthly income of individuals which is considered next.

5.2.7 Monthly income

The median monthly income of HIV-positive men [27,500 naira (range: <5,000 -130,000)] was significantly lower than that of controls [40,000 naira (range :< 5,000 – 150,000)] (P<0.05) (Table 5.4).

Table 5.4 Monthly income of HIV-positive men and controls

	Frequency (%)		
Income (Naira*)	**HIV-positive men**	**Controls**	**Total**
<5,000	9 (3.3)	2 (0.7)	11 (2.0)
5,000-9,999	47 (17.4)	17 (6.3)	64 (11.9)
10,000-49,999	118 (43.7)	124 (45.9)	242 (44.8)
50,000-99,999	62 (23.0)	83 (30.7)	145 (26.9)
≥100,000	6 (2.2)	6 (2.2)	12 (2.2)
Not stated	28 (10.4)	38 (14.1)	66 (12.2)
Total	**270 (100.0)**	**270 (100.0)**	**540 (100.0)**

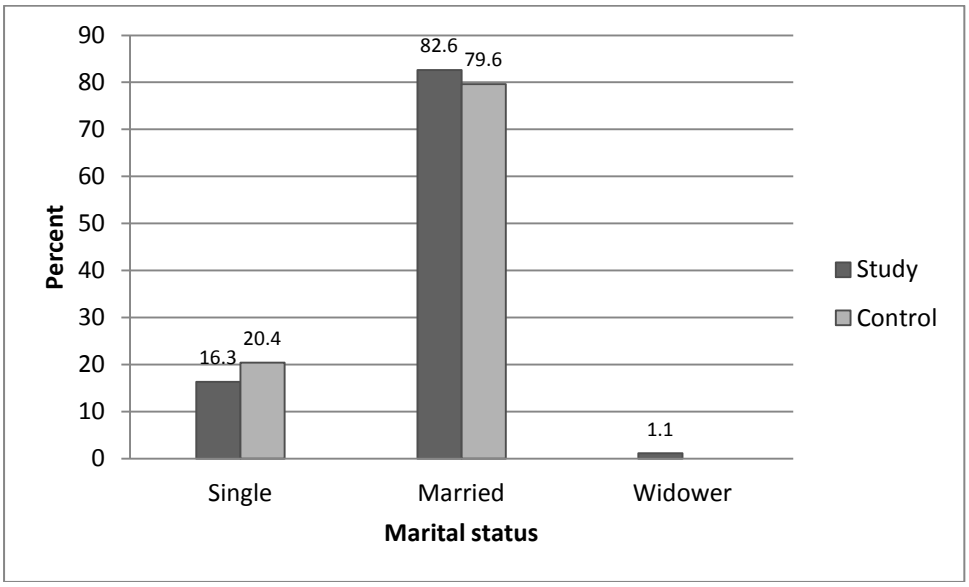
*160 Nigerian Naira≈1USD (United States Dollars)

Over a fifth (20.7%) of HIV-positive men lived on less than 2USD per day compared to 7% of men in the control group.

5.2.8 Marital status of HIV-positive men and controls

The majority of HIV-positive men (82.6%, n=223) and controls (79.6%, n=215) were married (P>0.05) (Figure 5.4). A few HIV-positive men (1.1%) were widowed.

Figure 5.4 Marital status of HIV-positive men and controls



Type of marriage

Of the 223 married HIV-positive men, 16.6% were in polygamous marriages. Similarly, 18.1% of the controls had more than one spouse (P>0.05) (Table 5.5).

Table 5.5 Type of marriage

	Frequency (%)		
Type of marriage	**HIV-positive men**	**Controls**	**Total**
Monogamous	186 (83.4)	176 (81.9)	362 (82.6)
Polygamous	37 (16.6)	39 (18.1)	76 (17.4)
Total	**223 (100.0)**	**215 (100.0)**	**438 (100.0)**

Number of spouses

The proportion of HIV-positive men with two and three concurrent spouses were 13.0% and 3.6% while the corresponding figures for controls were 15.3% and 2.8% respectively (Table 5.6).

Table 5.6 Number of spouses

	Frequency (%)		
Number of spouses	**HIV-positive men**	**Controls**	**Total**
1	186 (83.4)	176 (81.9)	362 (82.6)
2	29 (13.0)	33 (15.3)	62 (14.2)
3	8 (3.6)	6 (2.8)	14 (3.2)
Total	**223 (100.0)**	**215 (100.0)**	**438 (100.0)**

5.2.9 Duration of marriage among HIV-positive men and controls

HIV-positive men were married for a significantly longer period [median= 14 years (IQR: 10 years)] than controls [median= 8 years (IQR: 7 years)] (P<0.05) (Table 5.7).

Table 5.7 Duration of marriage among HIV-positive men and controls

	Frequency (%)		
Duration (years)	**HIV-positive men**	**Controls**	**Total**
<1	-	8 (3.7)	8 (1.9)
1-9	67 (30.0)	118 (54.8)	185 (42.2)
10-19	104 (46.6)	57 (26.5)	161 (36.8)
20-29	30 (13.5)	24 (11.2)	54 (12.3)
30-39	18 (8.1)	7 (3.3)	25 (5.7)
≥40	6 (2.2)	6 (2.2)	12 (2.2)
Total	**223 (100.0)**	**215 (100.0)**	**438 (100.0)**

In all, HIV-positive men and controls were well matched by age, educational status, religion, and ethnicity. However, there were important differences. First, a higher proportion of HIV-positive men resided outside urban Kano (25.9% versus 10.4%). Secondly, unemployment rate was higher among controls (14.4% versus 7.8%).Thirdly, HIV-positive men had lower monthly income with over a fifth (20.7%) of them living on less than 2USD per day as against 7% of controls. Finally, it is noteworthy that HIV-positive men were married for a relatively longer period compared to controls. The next subsection describes the clinical characteristics of the study participants.

5.3 HIV-related clinical parameters

5.3.1 Duration of HIV diagnosis and ART

The median duration of diagnosis was 2 years (range: 0.5 to 14 years) while the median period on ART was 1.7 years (range: 0.5 to 14 years) (Table 5.8).

Table 5.8 Duration of HIV diagnosis

Duration	Frequency (%)
<1	12 (4.4)
1-4.9	192 (71.1)
5-9.9	53 (19.6)
10-14	13 (4.9)
Total	**270 (100.0)**

5.3.2 Body Mass Index of HIV-positive men and controls

Nearly two-thirds of HIV-positive men (60.4%) and controls (65.9%) had normal BMI (18.5 to 24.9 Kg/m^2). Similarly just over a third of men in both groups were overweight while 2.2% of HIV-positive men were underweight. Overall, the weights of men in the two groups were similar (P>0.05) (Table 5.9).

Table 5.9 Body Mass Indices of HIV-positive men and controls

	Categories	Frequency (%) Control group	HIV-positive men (at the time of the study)
BMI	Underweight (<18)	-	6(2.2)
	Normal (18.5-24.9)	178(65.9)	163(60.4)
	Overweight (25-29.9)	92(34.1)	93(34.4)
	Obese (≥30.0)	-	8(3.0)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square test	P>0.05	

5.3.3 CD4 count for HIV-positive men

At baseline, 43.7%, 87.4% and 94.8% of HIV-positive men had CD4 counts of <200, <350 and <500 cells/MicroL respectively. The median CD4 count was significantly higher at the time of the study [362 cells/MicroL (181)] compared to baseline [209 cells/MicroL (IQR: 142)] (P<0.05) (Table 5.10).

Table 5.10 CD4 count at baseline and at time of study

	Count	Baseline	During the study
CD4 (cells/microL)	<200	118(43.7)	26(9.6)
	200-349	118(43.7)	99(36.7)
	350-499	20(7.4)	103(38.1)
	≥500	14(5.2)	42(15.6)
	Total	**270(100.0)**	**270(100.0)**
	Median (IQR)	209 (142)	362 (181)

5.3.4 WHO clinical stage of HIV/AIDS disease

At baseline and during the conduct of the study, 85.9% and 85.6% of men were at WHO clinical stage I respectively. Similarly, over a tenth of men were in stage II during both periods (Table 5.11) (Appendix 9, p. 374).

Table 5.11 WHO clinical stages at baseline and at the time of study

	Stage	Baseline	At time of study
WHO clinical stage	I	232(85.9)	231(85.6)
	II	29(10.7)	29(10.7)
	III	8(3.0)	9(3.3)
	IV	1(0.4)	1(0.4)
	Total	**270(100.0)**	**270(100.0)**

5.3.5 ART drug treatment

All HIV-positive men in this study were already on ART. Majority 247 (91.5%) were on first line ART regimens as specified in the national guideline (FMOH, 2010a) while the rest 23 (8.5%) were on second line drugs. None of the study participants was on salvage regimen (Table 5.12).

Table 5.12 Antiretroviral therapy combination received

ART drug combination	Frequency (%)
Combivir + Nevirapine	138 (51.1)
Travuda + Efavirenz	31 (11.5)
Efavirenz + Nevirapine	25 (9.3)
Travuda + Nevirapine	17 (6.3)
Combivir + Efavirenz	13 (4.8)
Zidovudine + Nevirapine	9 (3.3)
Efavirenz + Lamivudine	7 (2.6)
Efavirenz + Tenofovir	7 (2.6)
Other combinations	23 (8.5)
Total	**270 (100.0)**

5.3.6 Health status, optimism and discrimination

Most HIV-positive men (93.7%) described their health status on ART as 'good'. Nearly all (97.0%) reported that they slept well and the majority (76.0%) were optimistic about the future. An overwhelming majority (85.5%) agreed or strongly agreed (10.4%) that with proper management, PLWHA could live near normal lives. Furthermore, most of the HIV-positive men (77.0%) disagreed or strongly disagreed (23.0%) that they experienced discrimination as a result of their HIV status (Table 5.13).

Table 5.13 Health status, optimism and perceived discrimination against HIV-positive men

Attribute	Response categories	Frequency No. (%)
Self-assessed health status	Very good	16(5.9)
	Good	253(93.7)
	Bad	1(0.4)
	Total	**270(100.0)**
Optimism about the future	Optimistic	205(76.0)
	Not optimistic	65 (24.0)
	Total	**270(100.0)**
Sleep pattern	As usual	262(97.0)
	Not as well as I use to	8(3.0)
	Total	**270(100.0)**
With good management, PLWHA can live normal lives	Strongly Agree	28(10.4)
	Agree	231(85.5)
	Undecided	11 (4.1)
	Disagree	-
	Strongly disagree	-
	Total	**270(100.0)**
Feels discriminated due to HIV status	Strongly Agree	-
	Agree	-
	Undecided	-
	Disagree	208(77.0)
	Strongly disagree	62(23.0)
	Total	**270(100.0)**

5.3.7 Social groupings and attributes of in-depth interview respondents

The characteristics of HIV-positive men that participated in the in-depth interviews revealed their diversity in terms of age, marriage, education and occupation (Table 5.14).

Table 5.14 Demographic attributes of HIV-positive men that participated in in-depth interviews

Characteristic	Frequency
Age group	
30-39	11
40-49	8
≥50	3
Total	**22**
Marital status	
Single	2
Married	17
Divorced	1
Widower	2
Total	**22**
Education	
Non-formal (Qur'anic)	3
Primary	3
Secondary	13
Post-secondary	3
Total	**22**
Employment	
Trader	8
Civil servant	6
Driver	3
Farmer	2
Others	3
Total	**22**

5.4 Discovering their HIV-positive status

This section draws on data from in-depth interviews and survey responses of HIV-positive men. It describes the circumstances and motivation for the HIV test, how men received their test results, their immediate response and how they came to terms with it. In addition, it states the extent and reasons for disclosure and explores the likely source(s) of the infection from men's perspective. Therefore, this section lays the foundation for describing the sexual and reproductive behaviour of men in subsequent chapters.

5.4.1. Motivation for the HIV test and context

Seven themes emerged from interviews regarding the motivation, circumstances and reasons for taking the HIV test. These include: (1) recurrent illness, (2) pre-operative investigations and (3) routine antenatal testing of spouse. Other reasons were (4) health crisis in a partner or (5) child. A few other men were motivated by (6) media messages or (7) occupational exposure.

Recurrent illness

The most common reason (11/22) for taking the HIV test was recurrent illness unresponsive to treatment. Classical HIV/AIDS symptoms including fever, diarrhoea, weight loss and rashes were experienced by most men in this category. This prompted contact with the health care service resulting in physician-initiated HIV counselling and testing. For instance, a man decided to go to the hospital to investigate his health situation after unsuccessful treatment at home:

"I was sick with diarrhoea, unrelenting fever, rashes and had a general feeling of unwell. Initially my wife, a nurse, administered intravenous fluids on me at home. But I soon realised that it was not a permanent solution. I therefore, went to the hospital on my own…A doctor ordered several tests including HIV test. The HIV test came out positive" (Danliti, 36 year old man with two wives).

Another man confronted with a similar situation used both modern and traditional medication to no avail. Recognising the AIDS-like symptoms from the media campaigns, he went to the hospital and specifically requested the HIV test:

"It started when I noticed that I wasn't feeling as well as I use to. I use to feel like a stallion, full of life and energy. Then I became ill too frequently with fever, 'malaria', vomiting and diarrhoea. Whenever I received treatment, I only got transient relief. I also noticed frequent body rashes. My grandmother gave me a traditional remedy to no avail. Whenever I put on shorts or trousers it became stained because of the rashes exuding pus and the rashes were itchy. It was so itchy that sometimes I used a piece of metal to scratch my body to get some relief. I was in so much agony. At times I lost hope. My symptoms resembled the one they have been saying regarding AIDS on radio. I felt disturbed and one day I summoned courage and went to the hospital to request for HIV test which came out positive" (MallamWaine, 38 year old married man).

Incidental finding during pre-operative investigations

The second scenario involved incidental diagnosis during pre-operative work up (2/22) commonly for 'haemorrhoids'. The lay Hausa public refer to any disturbing anal condition as 'haemorrhoids', not necessarily in the pure surgical sense. With no classical HIV/AIDS symptoms, most of them were shocked by the positive HIV test:

"There was a time when I had 'Basir' (Hausa='haemorrhoids') which disturbed my life greatly. I had no symptoms of AIDS. I only complained about the 'haemorrhoids' to my late brother, who was a health worker at General Hospital, Potiskum. I told him that it has prolapsed and was bleeding making my life miserable. It was spoiling my underpants and trousers. Series of tests were ordered by the doctor who was to carry out the operation. I did not know that it included the HIV test. To my surprise, I was informed that I am HIV-positive!" (Usman, 44 year old married, polygamous).

Routine antenatal testing

Thirdly, most antenatal clinics in Nigeria, offer HIV tests routinely as part of the prevention of mother-to-child transmission of HIV (PMTCT) program. Women that test positive are requested to come along with their spouses during subsequent appointments (2/22). Some of these men decline such invitations, especially when they have no symptoms, as illustrated here:

"It was my wife who was first tested at the antenatal clinic and was told she was HIV-positive. She was instructed to invite me to come and take the test. When she told me I declined – I did not take her seriously – so I didn't go because I had no problems at that time – I was healthy or so I thought. It was only after I became sick six months later that I went to Maiduguri and had the test which came out positive" (Habu, 55 years old man, married to one wife).

Tested at the time of the wife's delivery

The fourth situation occurred when men were invited to take the test following their spouse's positive test during labour (1/22). These services are provided to women who did not register for antenatal care. A man narrates his experience:

"I was never sick. I came to know of my status when my wife got pregnant. When it was time to deliver, she became sick with fever and rashes and was unable to deliver on her own. I took her to Dawakin Kudu Hospital. On arrival, they tested her and told me she was HIV-positive. I was also tested and found to be positive. The child also died. We had four subsequent children, but none of them survived"(Ado, 36 year old man, married, monogamous).

Spousal illness or demise

The fifth scenario was when men suspected their HIV status following chronic illness or death of a spouse (2/22). A man stated the reason why he took the test:

"My wife died nearly 10 years ago. She initially complained of fever, thereafter, she frequented the toilet with diarrhoea visiting the toilet 5-6 times a day. Gradually she lost weight and became skin and bones. We tried several hospitals here in Kano to no avail. So I took her to a hospital in Edo State where they did the test and discovered that she was HIV positive. That was what prompted me to do the test. It also came out positive" (Jaimo, 53 year old widower).

Child's illness

The sixth situation arose when parents were tested following a positive HIV test for their ill child (2/22), as narrated here:

"It started when my first child was sick all the time with fever. So, we brought him to this hospital and they did several tests including HIV test. The HIV test came out to be positive. So, this shocked us and made us wonder if our child was HIV-positive, what is our own HIV

status as his parents? So, I and my wife requested to be tested. This they did and found both of us to be HIV-positive" (Gajere, 38 year old man, married to one wife).

Occupational exposure

The seventh was unique and a likely case of occupational exposure in a health care worker (1/22). Until recently, protocols for post-exposure prophylaxis were either non-existent or not implemented in some developing countries including Nigeria (WHO, 2005). This hospital cleaner took no action following an accidental needle prick. Months later, he had clinical features suggestive of HIV/AIDS which was subsequently confirmed:

"It was while emptying one of the refuse bins in a ward in this hospital in 2006 that I sustained a needle prick from a used syringe disposed of in the wrong container. I just continued my work and did not bother to tell anyone and it got healed (interviewee showed me the scar). *You know at that time there wasn't much awareness about the risk of getting diseases through finger prick and since it didn't pain me and no one had warned us beforehand I didn't report it. I completely forgot about it until 6 months later when I noticed that I was losing weight for no apparent reason. I now complained to my supervisor who suggested I consulted a doctor. The doctor interviewed me and ordered full investigations while I was admitted. The diagnosis then was tuberculosis. One of the test results (HIV test) came out positive" (Mahmuda, 48 year old married hospital cleaner).*

Finally, an asymptomatic couple encouraged by media messages, visited a VCT centre and requested for HIV test. They were shocked at the outcome:

"One day when we were discussing with my wife, we talked about HIV because we were always hearing on the radio and television people advising the public that one should do the test even if he had no symptoms. This was four years after our marriage. Since we did not take the test before marriage, we just went to Murtala Specialist Hospital VCT centre and requested for it. To our amazement, we were both HIV- positive (Jobdi, 44 year old, married man).

Apart from the last example, the common thread was that people went for HIV test after the appearance of symptoms or during health crisis of a significant other. Symptomatic men tried several traditional and orthodox remedies. It was when all these failed that contact was made with the health care service. Unlike women who were offered the test routinely as part of antenatal investigations or during delivery, men rarely had such opportunities. Even the few that were invited, not all accepted to do the test.

Post-test counselling and results communication

Many interviewees expressed concerns about the way their test results had been communicated to them. A man vividly recalls his unpleasant experience at the time of diagnosis:

"I won't forget, it is now about 10 years ago. At that time counselling was not well established. When the test was done and the results were sent to my doctor, he just came to my bedside during a crowded ward round and announced that my HIV test result was positive! I was devastated. In fact one of the reasons why I became an HIV activist is to help address this issue." (Danliti, 36 year old, married to two wives)

Another man used some strong words to express his feelings about the way his HIV test result was communicated to him:

"An uncultured and ill-mannered lady (health worker) came and told me in the most rude and discourteous manner that I am HIV-positive to the hearing of others (on the hospital ward). I told her that she should have told me this in a more civilized manner and in secret – but coming to announce that I am HIV-positive to the hearing of others is very callous and discourteous. Those early days anybody who heard that you are HIV- positive thought you are dead and avoided you like plague."(Dogo, 60 year old married with two wives)

These experiences were by no means universal. Some men indicated that their results were revealed in private and that the health worker was empathetic as illustrated here:

"The HIV test result was revealed to me in private. The health worker calmed me down and told me not to feel that being HIV-positive is the end of life. He told me that there are diseases that are even more dangerous than HIV and that if I follow the instructions and take my drugs regularly, I will live just like any other person…." (Atiku, 32 year old divorced man).

It is evident from this study that the decision to take the HIV test among men was neither spontaneous nor autonomous; it was usually prompted by the man's recurrent illness, spouse's positive test or a severely sick child who tests positive to HIV. Others were influenced by the media, family, friends and other acquaintances. A positive test could evoke intense distress. Therefore, adequate pretest and post-test counselling are essential, in addition to social support. The remainder of this section examines the immediate responses of men to a positive HIV test result.

5.5 Immediate response to HIV-positive diagnosis

This section describes how participants reacted to their positive test results. Emergent themes include shock, fear, worry and agitation. Others felt their days were numbered and that they would soon die. In addition, some men experienced suicidal thoughts, confusion and became disorientated. Furthermore, some of them felt they were in real trouble. In contrast, a few remained calm attributing it to their strong sense of spirituality. These themes are now described with illustrative quotes.

Shock and confusion

Some men were shocked, confused and disorientated when they received news of their HIV-positive status. They thought that they would soon die. Some turned to spiritual resources for strength and consolation:

"I was shocked! For four days – I did not know where I was. I was confused, disorientated and full of thoughts of dying. However, I prayed to God and after four days I left everything in the hands of God and I cooled down. As a Muslim I knew that whatever God has chosen for me is correct" (Usman, 44 year old married man, polygamous).

Devastation and Fear

Many respondents were devastated and frightened because of the sudden realization of imminent death. Based on this experience, a man recommended greater emphasis on pre-test counselling as he nearly regretted providing consent in the first place:

*"Kai! (*Hausa=Exclamation*) It was devastating. Despite the fact that I gave them the go ahead to do the test, I got frightened very much. Because you know five years ago, the perception out there was that anyone who is HIV-positive was a dead man walking. His life is finished. He will soon die since his days are already numbered. I was really disturbed. It was later that I realized the importance of preparing people's minds before undergoing such a test. Some people are really shattered when they get this type of test result. I am one of those that were really devastated on knowing that my result was positive" (Atiku, 33 year old divorced man).*

Suicidal ideation

Some men were agitated and wished they could end their lives. A man suggested that anyone who claims to be unperturbed by a positive HIV test result is not telling the truth. He contemplated suicide when he received the news:

"I was really disturbed and agitated by the result. In fact anybody who tells you that he is pronounced HIV-positive and is not worried, he must be telling lies. For me at the time, it was God that prevented a disaster from happening because if I were near a trailer vehicle passing by I would have committed suicide by running in the path of such a big vehicle to crush me. This was how I felt" (Idi, 46 year old married ex-drug law enforcement agent).

Spiritual calmness

In contrast to the preceding narratives, some respondents remained calm attributing this to their strong spirituality. They found solace in a supreme being and accepted the test result as their destiny:

"I did not feel disturbed because as a Muslim one must belief in destiny good or bad. I considered this as God's prescription for me. Let's not forget that some people are knocked down by fast moving vehicles and die instantly just as others die in their sleep. Even before God creates a person, He specifies how long he will live, how much he will get in this life and what will happen to him. Therefore, one cannot avoid what was prescribed for him nor can one protect himself from his destiny. One can only pray for succour from the Almighty to ease his lot. This is the truth" (Habu, 55 year old married man).

Immediate concerns after testing positive to HIV

Societal stigma and lack of cure of the disease were the immediate concerns of most men following the positive HIV test:

"Because of the terrible things I have been hearing about this disease called AIDS. It is only now that treatment is available, before now; the level of stigma was indescribable. You will see that when you stay in the same compound with others when they know your status, they avoid you, stigmatize you, your family and anything you touch" (Dankanoma, 35 year old married man).

In addition, some unmarried HIV-positive men blamed the discrimination they experienced in relationships for their delayed marriage:

"I was very disturbed. The main reason being that the disease is referred to by different obnoxious names e.g. (Kabari Assalamu Alaikum: Hausa="Grave here I come") with high level of stigma and discrimination. Also, the fact that I am yet to marry, who will I now approach to marry with my HIV-positive status?" (Sulai, 31 year old single man).

Some of the men were worried about the reaction of their families. They were particularly concerned about the response from their spouses. In addition, they were anxious about the HIV status of their spouses and being blamed for bringing the virus home. A man described his experience and offered an explanation for his spouse's calmness:

"I was really scared of how my wife will take this. I told them (at the testing centre) that my problem was not myself but my wife. I wanted her to also get counselled and tested so that she will know her situation. By the special grace of God she remained calm and took it very well. This I think is borne out of her in-depth knowledge of Islam. When she came and was counselled, tested and told that she was also HIV-positive, she said whatever God has pre-destined for one it would come to pass, good or bad" (Usman, 44 year old man, married, polygamous).

Another man had a similar concern, but when his spouse tested negative, this motivated him to adhere strictly to ART in order to protect the spouse and their unborn child:

"*My main concern was my wife; she was pregnant then, luckily she tested negative. You know they test all pregnant women when they attend antenatal clinics. This has given me hope and confidence that the infection (HIV) is only in me. My wife and hopefully my children will remain HIV-negative. This has also motivated me to take ART medications and adhere to it religiously. Also what has made me not to worry too much is my belief that everything comes from God. Whether or not one is involved in wayward behaviour, he can be tested by God in many ways and getting HIV infection is just one of these ways. One doesn't have any way of predicting or avoiding anything that has been pre-destined for him by God the Almighty. One can only look for ways of mitigating the effects of anything that befalls him" (Abdullahi, 33 year old man, married, monogamous).*

The next section uses data from the quantitative survey and in-depth interviews to describe the pattern and reasons for disclosure of HIV status among men.

5.6 Disclosure of HIV-positive status

Following HIV diagnosis, the decision to disclose was not an easy one for men. They faced the dilemma of whether to disclose or not and who to disclose to. This was due to the uncertainty of peoples' reactions to their disclosure. Therefore, most of those who chose to disclose, disclosed to their close confidants. There were reasons and motives for disclosure and non-disclosure. In this section, data from quantitative study and qualitative interviews are used to describe the pattern, reasons and consequences for disclosure.

Disclosure

From the survey responses, the vast majority 78.5% (*n*=212) of the 270 HIV-positive men disclosed to their spouses or sexual partners. By marital status, 93.7% (*n*=209) of the 223 married HIV-positive men disclosed to their spouses and by contrast, only 6.4% (*n*=3) of the 47 single HIV-positive men disclosed to their sexual partners.

Motivation and choice of those to disclose to

Those who decided to disclose their HIV status faced another hurdle in selecting those to inform. Apart from health care providers who administered the test or provided treatment and support, most men chose to disclose to their spouses and parents, especially their mothers, other close family members, friends and close confidants. In addition, some men informed HIV support group members. Narratives from qualitative interviews showed that disclosure of status was not a one-off event, but rather a process starting with family and friends expanding to the general public. The latter occurred mainly among officials of support groups while the majority of men limited disclosure to an inner circle of confidants.

People to whom men disclosed their diagnosis

These include officials of support groups, spouses, parents and other close relatives. However, over time, a few made their status public. They attributed their confidence to the training received from non-governmental organizations as illustrated here:

"Yes, I told my wife, father, mother and two brothers. But now, almost all the people in Kumbotso town and Rigafada village know that I am HIV-positive because I am the chairman of People Living with HIV in our community. If anyone comes to me, I tell them directly that I have HIV. If you like you can interact with me, if you don't you can leave. You know initially, we were all afraid of stigma and were hiding our status. Stigma almost incapacitated us. But as a result of the training and counselling we received from SWATCH (an NGO), I overcame it and an inner voice told me that everything belongs to God. So, stigma is no longer my problem" (Ado, 36 year old, support group official).

5.6.1 The process of disclosure

Findings from the qualitative interviews revealed that disclosure was predicated on closeness, expectation of support and consequences as exemplified here:

A man disclosed to his HIV-positive spouse in anticipation of her support. However, he kept his mother in the dark for medical reasons:

*"My wife is also HIV-positive so we support each other. You also know there are some secrets you reveal to your spouse but not to one's parents. So, also there are some secrets one could discuss with parents but not with his wife. I am the only grown up son of my mother and all her hope and support comes from me. You know how little our parents know about HIV/AIDS. They still think it causes instant death. Considering her age, condition of mind and the fact that she is hypertensive, I did not disclose my HIV status to her to avoid a catastrophe..." (Dankanoma, 35 year old married man, currently monogamous**).***

Another man's positive HIV status was inadvertently revealed to his mother while he was on admission for an unrelated ailment. He hitherto did not inform her based on medical grounds:

*"Initially, I didn't tell her (*referring to his mother*) because of her hypertension. However, when I had stroke two years ago, I was admitted and she took care of me in the hospital. So, while I was on admission they brought my supply of antiretroviral drugs and gave her. She asked me which drugs are these that are in such a large quantity like the one she is taking for hypertension. One of the nurses now told her that these are HIV drugs and must also be taken for life like the anti-hypertensives and that they are for her son. It was then that she interrogated me and I told her exactly what happened. I also told her the reason why I didn't tell her earlier. She understood" (Gajere, 38 year old married man, monogamous).*

The next section describes the motivations for disclosure among HIV-positive men.

5.6.2 Motivations for disclosure

A number of factors emerged as primary facilitators of HIV status disclosure in the current study. The first one was in anticipation of social, material and emotional support:
Facing imminent death, some men disclosed their status to those they felt would tell their story after their demise. One man's choice was based on trust and perceived level of understanding. He did not disclose to his mother based on her misperceptions about the disease, but he told his more enlightened brother:

"At that time I lost hope and thought I will soon die. I told him (his elder brother) *so that even if I passed away he will inform others. I didn't tell my mother because she is elderly and the way I heard her talk about the disease, if she comes to know that her son is affected by it , it will devastate her. So, I chose to tell my elder brother instead. He has had both western and Islamic education. He will understand the situation, rationalize it and handle it better than my mother. He will also not stigmatize me" (Sulai, 31 year old unmarried man**).***

In contrast, others disclosed to their mothers, especially if they lived together. A man narrated his mother's important psychosocial, economic and treatment support roles:

*"One cannot hide anything from his mother! She brought me into this world. Since we live in the same compound, she has been very supportive since that time. She checks and reminds me to take my medications. She also bought things for me, especially that time I was retrenched and out of job. She also bought nutritious food items for me to regain my weight" (Idi, 46 year old married, monogamous**).***

The second motivation for disclosure was a sense of responsibility. Some men felt it as an obligation to disclose to their spouses and close relations. They hoped that telling their partners or family members would free them from the burden of secrecy and garner support to carry on with their lives:

"Because she needs to know my condition; she is my wife for God sake! This is someone I am living with and she will know my visits to the hospital and will see me taking drugs every day of my life. Also, if she knows she will take steps to protect herself and our children. In short, I need her cooperation and support" (Abdullahi, 33 year old married, monogamous).

While most men that disclosed to their family members and friends got the desired support, others suffered rejection:

"My closest friend in my hometown was the first to desert me. If I touched anything, he will not touch it. He never used my spoon; he refused to use any cup that I had used even if it is scrupulously washed. We continued like this, I never showed him any annoyance. If food is served, I tell him to share the food himself and take his share before I take mine. We continued like this until a time when he slipped and fell in his workplace and sustained spinal injury (His friend was a labourer at 'Yan Lemu market where they carried heavy loads). *I stayed with him and nursed him. It was at that time that he apologized for all that he has done to me because of my HIV status. He said, he thought I was going to die immediately from AIDS. He asked for my forgiveness now that he was going to die before me. He also asked for my help in taking care of his children and the family he was leaving behind. He is late now and I kept my promise; at this point three of his children are under my care" (Ado, 36 year old married man, monogamous).*

Disclosure precipitated divorce in some cases. For one man, the joy of his partner's negative test result was short-lived as she packed out shortly afterwards despite initial assurances:

"She was shocked when I told her my positive test result. She went for the test and luckily she tested negative. My only problem now is that HIV has caused a problem in my marriage. In fact it has destroyed my marriage! When I first told her my HIV-positive status, she said she will take heart and continue to stay with me come what may, as she loved me so much…. However, two weeks ago, I don't know what happened. She packed and left my house unceremoneously – saying she will never come back to my house ever again" (MallamWaine, 38 year old divorced).

5.6.3 Reasons for non-disclosure

Respondents' reasons for non-disclosure were diverse. The first was fear of stigma and discrimination. Some men were afraid of societal rejection and discrimination following disclosure. A man recalled how people living with HIV in his community were treated long before he tested positive to HIV. Learning from that lesson, he kept his serostatus secret as he felt people would shun him if they knew his status:

"Only the health workers know my status. You know even before doing the test I had some little information about the disease and people stigmatized and discriminated when they became aware of someone's HIV-positive status. So, I kept my status a secret and considered it a destiny ordained by God" (Danjuma, 35 year old married, monogamous).

Despite reported strong bonds between men and their parents, especially mothers, some men chose not disclose to them. They offered their parents alternative explanations for their frequent visits to the hospital as illustrated in this quote:

"Yes, my wife and the health workers know my status. However, my mother and father do not know. I told them that I am suffering from a chronic kidney problem that requires me to frequent the hospital" (Abdullahi, 33 year old married, monogamous).

Another man provided a spiritual explanation for his non-disclosure. He was of the view that that if his status was meant to be revealed, he would have developed severe symptoms that he couldn't conceal. He felt the fact that he remained symptomless was divine:

"No I didn't reveal my status. This remained my little secret between me and God. If God wanted my status to be revealed to more people, I probably would have been bed-ridden, admitted to hospital before the test which will now be known by more people. Even you wouldn't have known my status if not because of your profession since I do not have obvious symptoms. The other person that knows is my wife and no one else" (Habib, 35 year old married man, currently monogamous).

The next section describes the perceived sources of HIV infection among respondents.

5.7 Perceived sources of HIV infection

Even though people found it difficult to pinpoint the source of their infection, most men had their suspicions. Most participants recounted risky sexual activities that could have exposed them to HIV infection. For instance, a retired drugs law enforcement officer blamed a cocktail of youthful exuberance, power, cash, alcohol and easy access to women for his predicament:

"The truth of the matter is – the type of life I lived as a young National Drug Law Enforcement Agent (NDLEA) officer with lots of money, away from my city of origin (Kano), in the southern part of Nigeria with lots of women was responsible. You know, first and foremost our job was to prevent people from taking drugs and other intoxicants but I tell you – nearly all the officials working for NDLEA, except the rare few protected by God, were all alcoholics. We had lots of cash and status – we moved from one beer parlour to another. Once you are into alcohol, any woman you see, you will be sexually aroused; especially women in southern Nigeria at that time were seductive. All they want was to come to your room and see that there is food. She will stay until the time you chased her away. Another one will replace her immediately until you get tired of her too. This was the way life was for us then in southern Nigeria. Once you have food they will come. Also, in the drinking joints once the women observe that you are buying alcohol and drinking and sharing with friends,

they will gather around you to entice you to become their friend and lover. I think this is how I got infected with HIV" (Idi, 46 year old ex-drug enforcement agent).

Others felt they got infected following their second marriage. Such men were in two categories: the first were a group of men that re-married after losing their first wives to complications of pregnancy, labour or to non-HIV related medical conditions. Others were engaged in culturally sanctioned concurrent polygny. Most of them regretted not taking pre-marital HIV screening tests as illustrated in this account:

"Well, it is only God that knows for sure, the reason that I got infected being that I am not a womanizer. The sources of HIV are varied. Unfortunately, among both men and women, background checks and HIV tests are not done routinely before marriage. I married a second wife after losing my wife of 3 years to Sickle cell crisis. I think this was the genesis of my getting HIV (he became emotional and silent for sometime). *Anyway I think it is only God who knows the exact truth" (Danjuma, 35 year old married, monogamous).*

A young man vividly recounts his ordeal in the hands of his favourite school teacher. As an unsuspecting secondary school student he was tricked into the teacher's bathroom:

"From my own suspicion and thinking I focus on one event. It was one of my teachers that caused this problem for me. You know some teachers have favorite students. So he used to send me to fetch water for him. On that fateful day he told me to take the water to his bathroom. So, I innocently did unaware that he was following me into his bath room. As I bend down to put the bucket on the floor, he removed my shorts and forcefully had anal intercourse with me. I was devastated, confused, wriggling in pains. He threatened me that if I informed anyone, I will be expelled from the school as it would be his word against mine. Why I strongly suspect that I got it from him is that, the teacher died and before his death he had prolonged illness that tallied with the symptoms that have been attributed to HIV/AIDS in radio and television programs. This is why I thought I got it from him" (Abubakar, 30 year old unmarried man).

Some respondents couldn't recall any event as a likely source of their infection:

"This is difficult to say. Only God knows. I, myself don't know how I got infected. I just discovered myself HIV- positive. I do not suspect anybody, person or episode…." (Ado, 36 year old married, monogamous).

The next section provides an account of risk perception by HIV-positive men and controls.

5.8 Risk perception by HIV-positive men

Using data from the quantitative survey and qualitative interviews, men's perception of risks of HIV transmission were assessed. Starting with an exploration of HIV-positive men's understanding of the risk of sexual transmission during condomless sex with serodiscordant partners followed by their perception of effects of ART and pre-exposure prophylaxis (Pre-EP) on sexual transmission:

5.8.1 Perceived chance of sexual transmission during condomless sex

While nearly all (95.6%) men in the control group thought that the risk of HIV transmission during condomless sexual intercourse among discordant partners was high or very high, the corresponding figure was significantly lower among HIV-positive men (74.8%). Conversely, more than a fifth of HIV-positive men felt the risk of transmission was low as against 0.4% in the control group. Difference in risk perception between the two groups was statistically significant ($P<0.05$) (Table 5.15).

Table 5.15 Comparison of sexual transmission risk perception between HIV-positive men and controls

Questions	Response categories	Frequency (%) Controls	HIV-positive men
Chance of sexual transmission of HIV without condoms	Very high	58(21.5)	21(7.8)
	High	200(74.1)	181(67.0)
	Average	11(4.1)	9(3.3)
	Low	1(0.4)	59(21.9)
	Total	**270(100.0)**	**270(100.0)**
Pearson's chi-square test		$P<0.001$	
Chance of HIV transmission when on ART drugs	Higher	8(3.0)	68(25.2)
	Same	62(23.0)	109(40.4)
	Lower	2(0.7)	93(34.4)
	Don't know	198(73.3)	-
	Total	**270(100.0)**	**270(100.0)**
Pearson's chi-square test		$P<0.001$	
Chance of HIV transmission with Pre-exposure prophylaxis	Higher	5(1.9)	66(24.4)
	Same	63(23.3)	122(45.2)
	Lower	-	82(30.4)
	Don't know	202(74.8)	-
	Total	**270(100.0)**	**270(100.0)**
Pearson's chi-square test		$P<0.001$	

From the qualitative interviews, some HIV-positive men indicated that there was a high chance of transmission between serodiscordant partners during condomless sexual intercourse:

"Yes if condomless sex occurs between a sero-positive man and sero-negative woman, she is at great risk of getting infected. If not by the special grace of God, she will get infected in the process. After a few days, one year or two years she will also get infected with HIV. The only solution is if the husband is positive while the wife is negative, the couple should come to the hospital where counsellors and matrons in the clinic will advise them on how to stay together - they are called discordant couples. They advised them to use condoms regularly" (Idi, 46 year old married, monogamous).

Some HIV-positive men considered condomless intercourse between discordant partners as an act of wickedness on the part of the sero-positive partner. They further stressed the importance of pre-marital screening regardless of age or appearances:

"There is a big risk. If he knows, then that is the height of all wickedness. So, also if it is the woman and she knows, then she has also demonstrated callousness beyond bounds. As it is now being announced on radio and in television stations people should as a matter of responsibility go for HIV test and other relevant tests before consummating any marriage. This should be done regardless of claims of virginity or sexual innocence. Background checks are recommended before marriage in Islam and this should be adhered to" (Danjuma, 35 year old married man, monogamous).

Some men took a moral position and condemned HIV-positive men who engaged in condomless sexual intercourse with sero-negative women. In addition, they stated that although condoms reduced horizontal transmission risks between discordant partners, it does not eliminate it. Furthermore, they recognized the importance of knowing the partner's HIV status:

"Really from my understanding it is irresponsible for a HIV-positive man to have sexual intercourse with a HIV-negative woman without condom protection. Even with the use of condom it is still risky. The most important pre-requisite is that the two persons involved should know each other's status. This is because it can lead to further spread of infection to innocent souls that are not aware of what the man is giving them. If they become infected you can see that they would also go on to spread the infection to others unknowingly all through the population and this shouldn't be so. If it spreads to the one sexual partner of the HIV-positive man, she would go on to infect like five other people, who would spread it to 10 other people who in turn will spread to 100 people and so on" (Abdullahi, 33 year old married man, monogamous).

5.8.2 ART and HIV transmission risk perception

More than a third (34.4%, *n*=93) of HIV-positive men were aware that ARTs reduced the likelihood of sexual transmission of HIV. However, the majority of HIV-positive men (40.4%, *n*=109) wrongly perceived the risk to be equal, whether or not one was on ART. In contrast, less than a quarter (23%, *n*=62) of men in the control group considered the risk as equivalent.

5.8.3 Perceived effectiveness of pre-exposure prophylaxis (PrEP) with ART

Nearly a third (30.4%) of HIV-positive men considered pre-exposure prophylaxis as effective in lowering the risk of sexual transmission of HIV. However, none of the participants in the control group thought so. Surprisingly, a quarter of HIV-positive men indicated that the risk of HIV transmission is even higher with PrEP. Furthermore, almost half of HIV-positive men and a quarter of the controls opined that the risk was same whether or not PrEP was used. On the other hand a substantial proportion (74.8%) of the control group expressed lack of awareness of the effectiveness of PrEP. The difference in perceived effectiveness of PrEP among participants in the two groups was statistically significant ($P<0.05$).
The next section describes men's perception of risks of transmission to women and children among sero-discordant couples.

5.8.4 Horizontal and vertical transmission risk perception

Using data from the quantitative study and qualitative interviews, this section describes men's perception of the risk of transmission of HIV to the woman and her child.

Over half (58.1%, *n*=157) of HIV-positive men were aware of the possibility of a HIV-positive man impregnating his sero-discordant partner without getting her infected. In contrast, less than a third (31.1%, *n*=84) of controls were aware of this possibility ($P<0.05$). Similarly, a greater proportion of HIV-positive men than controls acknowledged the possibility of a HIV-positive man fathering a HIV-negative child (79.6% vs. 30.0%, $P<0.05$).

Responses during qualitative interviews also revealed that some HIV-positive men were ignorant of safe conception options:

"It is really a difficult situation (referring to possibility of HIV affected couples having uninfected babies)*. I really don't know how the health workers advice them on this particular issue* (safe conception)*" (Usman, 44 year old married man, polygamous).*

A HIV-positive man was of the view that sero-concordant and sero-discordant couples should forget about childbearing except those that are lucky through divine intervention. He gave an example of such a divine favour, where his brother who despite having a HIV-positive spouse has been consistently having HIV-negative babies:

"They must forfeit that (having babies), *since there is now the risk that the partner may infect the negative partner during the process of making the baby. However, even in this situation sometimes God works magic. Remember my brother that I told you about? He is HIV-negative and his wife is HIV- positive. However, they have been making babies. They now have two sons, they do not use condoms. None of the children is HIV- positive" (Habu, 55 year old married man, currently monogamous).*

Two more respondents gave further personal accounts of HIV-positive couples having HIV-negative babies. They both emphasized the need to abide by instructions of the health care workers in order to have HIV-negative babies:

"Yes, it is possible (for HIV-positive couple to have HIV-negative babies). *If the woman follows instructions of the health workers the baby will be born HIV- negative. I have seen that several times. Even my wife, her last child was born when we have all tested HIV-positive. But like I told you all our children are HIV- negative" (Dankanoma, 35 year old married man, currently monogamous).*

Others reported knowing some sero-concordant couples who have also had HIV-negative babies as a result of adhering to health care workers' instructions:

"I do not only think of the possibility of HIV-positive couples having an uninfected baby, I know, because I have seen several examples of that. I know of some HIV- positive parents that had HIV-negative children because they followed the advice of the health workers" (Abubakar, 30 year old unmarried man).

5.8.5 Perceived hazards to the baby

Regarding the hazards faced by the unborn baby, most HIV-positive men recognized the increased risk to the baby, especially, if the parents do not adhere to ART medications before conception, do not attend antenatal care and avoid PMTCT services. They also advised on the importance of hospital delivery, nevirapine for the newborn and abrupt weaning after six months of exclusive breastfeeding:

"Yes, babies face hazards if one or both parents are HIV-positive. However, this risk is more among babies of parents that are not regular on their HIV drugs. This is especially so for the mothers. But if both parents take their drugs promptly, then there is little or no risk to the baby. And she should deliver in hospital where they provide her with drugs and advice to protect the baby while in the womb and after delivery. The baby is given nevirapine drops for 6 weeks. This is very protective. Also breastfeeding is allowed for 6 months only. Thereafter the baby is weaned off abruptly. Even during the 6 months of breastfeeding the baby must not be given water or any other liquids except medicines" (Idi, 46 year old married man, monogamous).

Another respondent was of the view that the risk of vertical transmission could be mitigated by adhering to the instructions of health care workers. However, he believed that a child pre-destined to be HIV-positive would become HIV positive, regardless of the precautions taken:

"Yes there is a hazard to the baby. However, it only manifests if the parents did not seek help from the health workers and counsellors or if they do not follow the instructions given to them by these health workers. In addition, if they do not ask for clarification whenever they are unsure of what to do. This is when the baby is at increased risk. Otherwise there are medical ways in which the baby can be safe. However, if God predestines that the baby will be born with HIV there is nothing one can do" (Danliti, 36 year old married, polygamous).

5.8.6 Perceived risks associated with breastfeeding

Men's perception of risk to the baby during breastfeeding varied. Some HIV-positive men were of the view that breast milk of HIV-positive mothers was poisonous and harmful to the baby and that it should be replaced with breast milk substitutes or a wet nurse:

"The woman should not breast feed the child because breast milk comes from the mother's blood and since she is HIV- positive, her breast milk is poisonous and dangerous to the baby. So, she should prepare artificial milk and give the baby rather than her breast milk. If the mother breast feed the baby, the baby will be automatically infected with HIV. It is also possible that the baby be breastfed by a HIV- negative wet nurse. If she has a HIV-negative sister who has given birth recently she could breastfeed her own baby together with the baby whose mother is HIV- positive" (Jaimo, 53 year old widower).

The next sub-section describes how HIV-positive men understood and interpreted their situation with respect to relationships and intermarriages and how they were influenced by their HIV status.

5.9 Relationships and intermarriage

Most respondents were married and had children before testing positive to HIV. Although the positive HIV test result disrupted some marriages, the majority endured. In addition, HIV/AIDS prompted the emergence of a match-making scheme in which marriages took place among HIV-positive men and women. The underlying purpose of the scheme was to ensure sero-concordance and socio-economic compatibility. This is organized under the auspices of the hospital's HIV support group.

The support group was formed to enhance PLWHA's coping strategies and prevent the spread of HIV infection. Members hold monthly meetings and provide psychosocial, emotional and spiritual support to one another. Leaders are elected for a fixed term and their functions are clearly stated in the constitution. Key activities are in the areas of positive living, disclosure, stigma reduction and establishing marital relationships. The support group ensured the best possible match for an enduring marital union as described here by an official:

"We have a support group that holds monthly meetings. We make it known during our meetings that single, divorced or widowed men and women who are interested in marriage should register their names with the officials after the meeting. I can tell you that I have been instrumental in match-making and marriage of up to 30 couples. As an official of the support group, when they come and indicate their interest, we ask them their specifications regarding the prospective husband's income level, number of existing wives, and other qualities. Similarly, men are asked about the lady they would prefer, do they want a lady who has never married? Do they prefer divorcees or widows with one, two or a specific number of children? So, if the specifications from the men tallies with that of the women, we facilitate contact and meeting between the prospective bride and bridegroom. We also carry out background checks on the man, especially, his religion, occupation, level of responsibility etc. We do not just take their words – we go on to practically check and confirm the claims before going further to arrange the marriage formalities. We do this discretely and considering the fact that Islam accepts background checks before marriage. If on the other hand we discover that the man is irresponsible, is a wife beater and doesn't provide food for his family, then we do not encourage the formalization of the marriage because we cannot be a party to such weddings which may result in suffering of the wife. By the grace of God so far the marriages that we have arranged have worked well" (Usman, 44 year old married, support group official).

Despite this well conceived scheme, some HIV-positive men married unsuspecting HIV-negative women without revealing their HIV status. The officials had a way of getting information about such marriages and they went to great lengths to prevent them. Law enforcement agents were occasionally involved:

"Some of the men are not sincere when it comes to marriage. They hide their HIV-positive status from prospective brides. So, these young women get married to them and we only get to know sometimes after the marriage has been consummated. For example, there was one of the men, who did this, when we confronted him he reported me to a police station. I was lucky when I explained the situation to the divisional police officer, he understood and supported me. In fact, the man was placed under custody in the police cell for a period of one week. After a week I went back to beg for his release. This was done after giving him a stern warning not to deceive any other woman again. He has now returned to us and is married to a HIV-positive woman from among our female members. These are some of the challenges we face. As a Muslim you know Islam frowns at anyone who breaks up a marriage. But when you see a HIV-positive man who hides his status and goes out deliberately to marry unsuspecting HIV-negative women, it is difficult to look the other way. This is our real dilemma. When we know about any such planned weddings, we meet the scholar who is about to officiate the wedding and tell him the situation. We also discuss with the wife-to-be, her parents and the man's parents. If all parties accept the situation the way it is and want to go ahead with the wedding, we at least are exonerated. This is really a difficult situation for us as officials of the support group" (Ado, 36 year old married support group official).

Sometimes it is HIV-positive women who were already on ARTs that deceive prospective suitors. They bring such men to the VCT centre and attempt to corrupt the health workers into conniving with them to hide their status:

"Also there are some women who come with a suitor to the VCT centre. They (the women) are HIV-positive and are already taking ARTs, but they hide the fact from the prospective grooms. They want the health workers to connive in concealing their HIV-positive status from these men. But based on professional ethics these health workers do not allow such connivance. However, this type of collusion happens in other hospitals (especially some private clinics because of money), not Aminu Kano Teaching Hospital and it is very sad. All HIV positive men and women should own up to their status and protect the society from further spread of the virus. When such dubious marriages are consummated it leads to the spread of the virus in the society" (Usman, 44 year old married, polygamous).

Despite all these difficulties, sometimes the power of love prevails and sero-discordant marriages take place with full disclosure and consent of parties involved. Men were quick to cite examples of women in such marriages who remained HIV-negative and had HIV negative children:

"My current wife is HIV- negative and both our (two) children are HIV negative. I met her when she accompanied her relative to the court where I worked. I disclosed my intention to marry her, but told her upfront that I have a problem. She asked what the problem was; I told her that I am HIV-positive. She said she is HIV-negative but loves me anyway and agreed to my marriage proposal. She indicated her readiness to die together with me" (Ibrahim, 42 year old married man, monogamous).

Apart from stigma, some single men felt their HIV-positive status restricted their choice of marriage partners resulting in delays in getting married:

"I was very disturbed. The main reason being the high level of stigmatization and since I am yet to marry who will I approach to marry me?" (Sulai, 31 year old unmarried man).

However, after commencing ARTs, some of these men declared their intention to get married through the support group's scheme:

"You know I just commenced ARTs this year and as a new comer, it is now that they are enlightening me about the support groups, membership requirements, rules and benefits. Yes, it makes sense and at 30 years I will start thinking about what to do in the support group regarding marriage since I am not growing any younger" (Abubakar, 30 year old unmarried man).

These men indicated that they would marry only HIV-positive women for reasons such as freedom from the burden of secrecy and fear of retribution:

"In my situation, it is compulsory that if I am getting married, it has to be someone who is HIV-positive. This is because if I marry a woman who is HIV-negative and I infect her, if she dies – I will be responsible for her death. This is one of the reasons. Also, if you marry a woman who is HIV-negative you have to be hiding and concealing your drugs. For how long will you successfully do that? It is better to marry an infected woman so that you can live your life openly, whatever happens you will not be blamed for her death as you met with her when she is already HIV positive. That is the reason" (Sulai, 31 year old unmarried man).

Similarly, a man who lost two wives to HIV/AIDS faced the daunting task of finding a woman that would agree to marry him. His experience of nursing his two late wives and a likelihood of been blamed for the death of a third woman accentuated his fears:

"I have plans to remarry but what is preventing me now is my HIV-positive status. Any woman that I approach now if she comes to know of my situation she will be afraid and desert me. I am also afraid of infecting them. I don't want to marry a woman who will be sick like my two late wives. They can also take me to court for infecting them with HIV. I do not have the resources to compensate them" (HabuFari, 43 year old widower).

5.10 The effects of HIV-positive status on gender relations

In the study setting, cultural practices related to courtship dictate that men declare their interest first. However, under the match-making scheme, women were required to explicitly state their specifications and preferences regarding suitors upfront. This is rarely voiced explicitly under normal circumstances. In addition, HIV engendered empathy and open discussion between partners. These are all exceptions rather than the rule in this culture:

"I told them that my problem was not myself but my wife. I want her to also get counselled and tested so that she will know her situation. The counsellor told me that, that is not a problem. Afterwards I brought my wife for counselling and testing. I was really scared of how my wife would take this, if she is positive. But by the special grace of God she remained calm and took it very well when she had the test and it came out positive" (Usman, 44 year old married man, polygamous).

Some men became more considerate by easing the reproductive burden on their spouses:

"Because my wife is also HIV- positive. You have to feel pity for them especially with HIV, pregnancy and child birth is a real challenge on the health of women" (Danjuma, 35 year old married man, monogamous).

A man strongly opposed the view making the rounds in some quarters that women facilitated the spread of the virus more than men. He placed the blame squarely on the door steps of men and based his argument on the biological differences between men and women:

"I have always been surprised with the stories going round that women are the ones that are spreading HIV. How possible is this, since it is men that pour some liquid containing the virus from their body (semen) into women during sexual intercourse? He leaves the liquid (i.e. the semen) inside the woman. Since this liquid does not come back into the body of the man, so how can people say it is women that are spreading HIV? In fact I question this assertion (laughter). So, I think it is men, especially those that have several sex partners that spread HIV in this community. But there is really a need to investigate this matter. It is really perplexing and hard to understand for me" (Atiku, 33 year old divorced man).

The next section describes men's experience of stigma in the community.

5.11 Societal stigma and discrimination

Using data from qualitative interviews, men's experience of societal stigma is described. Most men reported that they encountered considerable stigma in the early days, but this has gradually reduced with time:

"Initially, we were all afraid of stigma. We were hiding our status and stigma almost incapacitated me. But I overcame it and an inner voice told me that everything belongs to God. And I am not looking for anything from anyone. I am not shy or afraid of anyone. So, stigma is no longer my problem" (Ado, 36 year old married man, monogamous).

This was attributed to increased awareness about the infection, especially in urban settings. However, some people even changed the clinics they attended or deliberately arrived late to avoid being noticed by others who may deduce their HIV status:

"It is the issue of stigma. It is one of the problems that has reduced but has refused to go away completely. This is especially so among the rural folks. For some of them, stigma is still severe that they request to be transferred to other centres where they will not meet familiar

faces when they come to HIV treatment clinics. Sometimes they also delay arrival to the HIV clinic, until other clinics have finished seeing patients and are closed for the day before they come to ensure confidentiality" (Ado, 36 year old married man, monogamous).

Others stated that they faced stigma and discrimination from members of the community but not their family and relatives:

"I really faced a lot of discrimination and stigma. People were saying that they had suspected that I had the disease due to my weight loss and rashes. However, I did not face any of such discrimination or stigma from my relatives and immediate family…" (Danliti, 36 year old married man, polygamous).

In contrast, some men felt their non-disclosure protected them from societal stigma:

"The fact is I have not faced any stigma or discrimination. This is because only my close relatives and parents know. The people that are aware of my HIV status apart from health workers are; my wife, my mother, my grandmother, my father, my brothers and my mother-in-law. None of them has even told me or acted in a way that I felt discriminated or stigmatized. They only ask me about how my health is. No other person knows, so you can see there is no basis for any discrimination" (MallamWaine, 38 year old married, monogamous).

In order to avoid stigma, a non-Hausa man did not disclose his status. He was of the view that compared to other ethnic groups, Hausa men discriminated more against PLWHAs:

"They don't know because if they do they would avoid me. They stigmatize people that are HIV- positive especially, the traditional Hausa men in northern Nigeria. Although they claim to be religious but they stigmatize people. However, other tribes do not stigmatize to the extent that Hausa men do. The Hausa man will withdraw from you completely. He will not touch a cup that you have used. But I have observed that other tribes do not stigmatize this way" (Dogo, 60 years married, polygamous).

5.12 Chapter Summary

Most men took the HIV test because of recurrent illness, pre-operative investigations, spouse's positive test during antenatal care or a health crisis in a partner or child. Others were motivated by media messages or occupational exposure. Voluntary counselling and testing was rare. Reactions to HIV-positive diagnosis include shock, fear, worry and agitation. Others equated the diagnosis to a death sentence. In addition, suicidal thoughts, confusion, disorientation and dismay were expressed by some. In contrast, a few persons remained calm.

The majority of HIV-positive men and controls were in the third or fourth decades of life, more than half in each group had at least secondary education, resided in urban Kano and were predominantly Hausa Muslim. HIV-positive men and controls were mostly traders, civil servants or farmers and mostly married, more than a tenth in each group were polygamous. In all, HIV-positive men and controls were well matched, except for differences in place of residence, employment rate, income and duration of marriage, which are considered in the interpretation of study findings in chapter 9.

Most HIV-positive men were diagnosed an average of two years earlier and had received ART for the same duration. They were mostly at WHO clinical stage I at enrolment. Almost two-thirds of HIV-positive men and controls had normal BMI and majority of infected men had low (<350 cells/MicroL) CD4 counts at baseline. In addition, most HIV-positive men rated their health status as 'good', slept well and were optimistic about the future. An overwhelming majority opined that with proper management, PLWHA could live near normal lives.

Immediate concerns following diagnosis were societal stigma and spousal response. Disclosure was made only to spouses, parents and other close confidants except a few who made their status public. Most men had a hunch regarding their source of infection, but a few had no clue. Risky sexual life fuelled by youthful exuberance, power, cash, alcohol and easy access to women, second marriages, non-consensual sex and occupational exposure were mentioned. The test disrupted some marriages, but the majority endured.

While most men in the control group felt HIV transmission during condomless sex as inevitable, a third of HIV positive men were of the view that condomless sexual intercourse among serodiscordant partners does not lead to HIV transmission. This complacency and low risk perception among HIV-positive men has been linked with high risk behaviour in the literature and has implications for HIV/AIDS control programmes as further discussed in chapter 9.

HIV/AIDS prompted the emergence of a match-making scheme in which sero-concordant marriages were arranged based on socio-economic compatibility. Although marriage brokerage is not new in Hausa culture, requesting women to explicitly state specifications and preferences regarding suitors is unusual. In addition, HIV engendered empathy and open discussion between partners. This has been shown to improve utilization of sexual and reproductive health care. Men reportedly encountered considerable stigma in the early days,

but this has gradually improved. The implications of these findings on sexual and reproductive behaviour are further discussed in chapter 9.

With the availability of ART treatment, despite the initial shock, most men incorporated their HIV status into their lives making necessary alterations to live as near “normal” a life as possible. The effects of HIV diagnosis and its treatment on the sexual and reproductive lives of these men are described in the following chapters.

Chapter 6 Findings: Sexual Behaviour of HIV-Positive Men versus Controls

6.1. Introduction

This chapter draws on data from both the quantitative survey and the qualitative interviews in order to examine the influence of HIV-positive status and its treatment (ART) on men's sexual behaviour. Libido and sexual activity were compared before and after HIV-positive diagnosis followed by a comparison with matched controls. The chapter answers the following research questions: (i) What is the sexual behaviour of HIV-positive men? (ii) Are there changes in men's *sexual* behaviour following HIV-positive diagnosis? If there are, what are the motivations and reasons reported by participants? (iii) How does the *sexual* behaviour reported by HIV-positive men compare to the behaviour reported by matched controls?

6.2 Libido and HIV diagnosis

Overall, the proportion of men rating their libido average was similar before (80.0%; *n*=216) and after (84.1%; *n*=227) testing positive to HIV. More than a tenth ranked theirs high before diagnosis while 9.6% did so after the test. The rest reported low libido on both occasions (*P*>0.05) (Table 6.1).

Table 6.1 Libido of HIV-positive men before and after diagnosis

Attribute	Response categories	Frequency (%) Before diagnosis	After diagnosis
Libido	High	42 (15.6)	26 (9.6)
	Average	216 (80.0)	227 (84.1)
	Low	12 (4.4)	17 (6.3)
	Total	**270 (100.0)**	**270 (100.0)**
	McNemar's test	*P*=0.07	

6.2.1 Changes in libido by duration of HIV diagnosis

Considered by duration of diagnosis, the proportion of those reporting 'high' libido decreased from 13.6% to 6.8% post-diagnosis among those tested within the preceding year (≤1 year). In contrast, those assessing theirs 'average' increased from 81.4% to 86.4% while those who

reported 'low' libido increased slightly from 5.0% to 6.8%. These changes were not significant (p>0.05) (Table 6.2).

Table 6.2 Changes in libido among those diagnosed ≤1 year of the study (N=59)

	Before HIV-positive diagnosis Frequency n (%)	After HIV-positive diagnosis Frequency n (%)
Libido		
High	8(13.6)	4(6.8)
Average	48(81.4)	51(86.4)
Low	3(5.0)	4(6.8)
Total	59(100.0)	59(100.0)
McNemar's test, p>0.05		

Among men diagnosed >1 year before the study, the proportion reporting 'high' libido decreased from 16.1% to 10.4% following diagnosis while those reporting 'average' libido increased from 79.6% to 83.4%. Similarly, the proportion of men who assessed their libido as 'low' increased from 4.3% to 6.2%. However, these changes were also not significant (p>0.05) (Table 6.3).

Table 6.3 Changes in libido among those diagnosed >1 year before the study (N=211)

	Before HIV-positive diagnosis Frequency n (%)	After HIV-positive diagnosis Frequency n (%)
Libido		
High	34(16.1)	22(10.4)
Average	168(79.6)	176(83.4)
Low	9(4.3)	13(6.2)
Total	211(100.0)	211(100.0)
McNemar's test, p>0.05		

These responses were corroborated during qualitative interviews where most men felt their libido was average before diagnosis and remained so following diagnosis:

"I have been hearing people talk about increased libido in the clinic, but personally I did not notice any difference. I think the initial ill health and fear of dying dampened their thoughts about sex and when they started feeling better on ARTs, the return to their normal healthy self made them feel sexually rejuvenated. For me, I have not noticed any excessive sexual urge after starting the ART drugs." (Mahmuda, 48 year old, re-married widower).

However, few men reported high libido after commencement of ARTs:

"In fact when I started taking the drugs (ART) they made me feel that one wife is not enough. I felt like marrying a second wife……..My current wife agreed that I should marry an additional wife. She even said if I don't have the money for the wedding, she is ready to save her monthly wage to sponsor it…." (Ado, 36 year old married, monogamous)
Some of the men who experienced increased libido on ARTs discussed it with their peers and consulted health care workers:

"Aah – there is a difference! Although at first I felt demoralized and lost interest in sex completely because of the HIV test result, but when I started taking the drugs (ARTs) my libido increased remarkably. Definitely, I had to even ask the Doctor about this. Also, on discussing with other men I discovered that I was not alone…." (Usman, 44 year old married man, polygamous).

One man attributed the increased libido to one of the ART drugs:

"There is one of the drugs (it is blue in colour). To God! I think this particular drug is an aphrodisiac. … Since I started taking it, I feel I cannot live with only one wife. I think I can satisfy three wives without any problem…" *(Ibrahim, 42 year old married man, monogamous).*

In contrast, a few men complained of a marked decrease in libido and reduced coital frequency following the HIV-positive test. The situation remained same even after they were placed on ARTs. They struggled to cope with marital sexual obligations and this resulted in disputes:

"Before I came to realize my HIV-positive status, my libido was high because I was feeling very healthy. I had sexual intercourse more than four times a week. During each round (of sexual intercourse) I sustained it for about an hour. But now after knowing my status everything has gone down. In fact we now have incessant fight and dispute with my wife because of my lack of interest in sex. She thinks I no longer love her." (Danjuma, 35 year old married man, monogamous).

However, some of the men attributed the decline in libido to aging. A man recalled with nostalgia his sexual performance during his younger days:

"Before I became HIV-positive, I was much younger, more sexually adventurous with good performance in bed. But now I am approaching 50 years. I think I got infected when I was 28-29 years old. So, I was very active then, unlike now…." (Idi, 46 year old married man, monogamous)

HIV-positive men who had low libido also discussed among them and requested for help from the health care workers:

"Secret discussions between me and other men in the clinic showed near total disappearance of libido among some of use following the HIV positive test result …when we complained to the doctor, he suggested oranges and bananas as remedy." (Danjuma, 35 year old married, monogamous).

Majority of men rated their libido average while few others reported low or high libido before and after testing positive. Some of the men reporting high libido after the test and treatment attributed it to the ART drugs while those rating theirs low blamed it on the devastating effects of the diagnosis, fear of infecting their partners or aging.

In the next section, the pattern of sexual activity of HIV-positive men is described before and after testing positive to HIV.

6.3. Sexual activity among HIV-positive men

6.3.1 Patterns of sexual activity

All (100.0%; *n*=270) HIV-positive men reported that they were sexually active before testing positive to HIV. The majority (91.9%; *n*=248) reported that they remained so after the positive HIV test.

Changes in sexual activity by duration of HIV diagnosis

Among HIV-positive men diagnosed within the preceding year (≤1 year), the proportion of men who were sexually active post-diagnosis (84.7%) was significantly lower than before diagnosis (100.0%) ($p<0.05$). In contrast, among those diagnosed with HIV over a year earlier, the proportion of men reporting sexual activity after diagnosis (93.8%) was similar to the proportion (100.0%) before diagnosis ($p>0.05$) (Table 6.4).

Table 6.4 Changes in sexual activity by duration of diagnosis

	Diagnosed ≤1 year (N=59) Frequency n (%)		Diagnosed >1 year (N=211) Frequency n (%)	
Sexual activity	Before diagnosis	Post-diagnosis	Before diagnosis	Post-diagnosis
Sexually active	59 (100.0)	50(84.7)	211 (100.0)	198 (93.8)
Abstinent	-	9 (15.3)	-	13 (6.2)
Total	59 (100.0)	59 (100.0)	211 (100.0)	211 (100.0)
McNemar's test, p<0.05			McNemar's test, p>0.05	

Coital frequency of HIV-positive men before and after diagnosis

Overall, the median reported coital frequency of HIV-positive men was significantly lower post-diagnosis [3 (inter-quartile range: 2)] compared to the pattern before the test [4 (inter-quartile range: 2)] ($P<0.05$) (Table 6.5).

Table 6.5 Coital frequency of HIV-positive men before and after diagnosis

Attribute	Response categories	Frequency (%) Before diagnosis	After diagnosis
Coital frequency	Abstinent	-	22(8.1)
	≤1/week	25(9.3)	14(5.2)
	2-4/week	190(70.4)	183(67.8)
	≥5/week	55(20.4)	51(18.9)
	Total	**270(100.0)**	**270(100.0)**
	Median (IQR)	4(IQR=2)	3(IQR=2)
	Wilcoxon signed rank test	*P*<0.05	

Changes in coital frequency by duration of HIV diagnosis

When categorised by duration of diagnosis, the pre-diagnosis median coital frequency of those diagnosed within the preceding year (≤ 1 year) [(4.0, IQR=3.0)] was significantly higher than the post-diagnosis median [(3.0, IQR=2.0)] (p<0.05) (Table 6.6). In contrast, there was no difference in the pre-diagnosis median coital frequency [(3.0, IQR=3.0)] of those diagnosed over a year earlier compared with their post-diagnosis coital frequency [(3.0, IQR=2.0)] (p>0.05) (Table 6.7).

Table 6.6: Changes in coital frequency among HIV-positive men diagnosed ≤ 1 year

Attribute	Response categories	Frequency (%) Before diagnosis	After diagnosis
Coital frequency	Abstinent	-	8 (13.6)
	≤1/week	9 (15.3)	3 (5.1)
	2-4/week	30 (50.8)	30 (50.8)
	≥5/week	20 (33.9)	18 (30.5)
	Total	**59 (100.0)**	**59 (100.0)**
	Median (IQR)	4.0 (3.0)	3.0 (2.0)
	Wilcoxon signed rank test	P<0.05	

Table 6.7: Changes in coital frequency among HIV-positive men diagnosed > 1 year

Attribute	Response categories	Frequency (%) Before diagnosis	After diagnosis
Coital frequency	Abstinent	-	14 (6.6)
	≤1/week	16 (7.6)	11 (5.2)
	2-4/week	160 (75.8)	153 (72.5)
	≥5/week	35 (16.6)	33 (15.6)
	Total	**211 (100.0)**	**211 (100.0)**
	Median (IQR)	3.0 (3.0)	3.0 (2.0)
	Wilcoxon signed rank test	p>0.05	

The themes from qualitative interviews indicated that some men had reduced coital frequency because of the devastating effects of the HIV test result and interference of condoms on their sex lives:

"From the day I knew my HIV-positive status, we only had sexual intercourse on two occasions and discontinued thereafter till now. On those two occasions we used condoms as advised by the health workers in the clinic. It appears my wife did not enjoy it, so did I and my mind was disturbed and unsettled…" (MallamWaine, 38 year old married, monogamous).

Others employed desperate measures in order to avoid infecting their spouses with HIV. Despite using condoms they felt it did not provide adequate protection to their sexual partners:

"*In fact, in addition to using condom, I do not allow myself to ejaculate. I fake to her that I am exhausted. If she is convinced, we then lie still and my semen will flow into the condom which I later remove carefully and discard. I do all these because I don't want her to get infected with HIV.*" *(Abdullahi, 33 year old married man, monogamous).*

Overwhelmed by her acceptance to marry him despite his HIV-positive status and realizing the risk to his HIV-negative spouse each time they had intercourse, a sero-discordant man reported experiencing psychological distress whenever they had sexual intercourse. This led to a reduction in coital frequency:

"For me, I considered it the ultimate love when my (HIV-negative) wife agreed to marry me despite revealing to her that I am HIV-positive. However, whenever we are to have sexual intercourse with her my heart bleeds and I have psychological disturbance because of the risk I am exposing her to." (Habib, 35 year old married man, monogamous).

Some unmarried men reported abstaining from sexual intercourse since realizing that they are HIV-positive:

"After my HIV-positive diagnosis I stopped having sexual relationships altogether. In any case, I don't have a wife, so this has not been a problem…" (Sulai, 31 year old unmarried man).

In contrast, a man reported that things have remained same after the HIV positive test and ART. He carried on as usual:

"Not much has changed; I can go on with a woman for three, four or even five rounds as usual. Stopping at two rounds doesn't usually satisfy me. All I just need is to replenish with a drink, even sachet water will do, then I continue…" (Ibrahim, 42 year old married man, monogamous).

Overall, most HIV-positive men in this sample remained sexually active. However, there was significant reduction in coital frequency. In addition, a proportion of men abstained from sexual intercourse altogether. The reasons for abstinence are described in the next section.

6.3.2 Reasons for reduced coital frequency and abstinence

Several reasons were proffered for diminished sexual activity or abstinence following a positive HIV test. The main reason was fear of transmitting HIV to sexual partners. Some single men blamed this for their inability to marry:

"Since then my interest in women completely disappeared. This is because I don't want any other person to experience the way I feel being HIV-positive. Not even my enemy. So, I don't want anyone to get this disease from having sexual intercourse with me. This is what inhibited any feeling towards women or sex. At least for me it has already happened and I consider it a test from God but I don't want to be responsible for infecting anybody. This is the reason why I have not considered marriage up to now. I have junior brothers who are married and have children already. But I seem not to be able to gather enough courage to even start 'tosting' (a local slang for 'seeing' or 'dating') *a girl talk less of marriage or having sex due to my profound fear of infecting an innocent soul." (Abubakar, 30 year old, unmarried man).*

Others were concerned about the energy expended during sexual intercourse and its effect on their health. This was something they never considered before testing positive to HIV. In response to an inquiry regarding his sex life before and after the HIV test, a man said:

"The difference is clear. When I was healthy I could have sexual relationship the way I desired without restriction. I approached my wife for sex without any thoughts or fears but now that I am HIV-positive, sex is now given a serious thought before engaging in it for the fear of aggravating my health condition in terms of increased exertion, energy expenditure and disease progression. So, I am more careful and my sexual frequency has definitely reduced." (Habu, 55 year old married man, currently monogamous).

Some men reduced their coital frequency to conserve precious nutrients perceived to be lost in the semen. This was considered difficult to replace and detrimental to men's health:

"I just want to preserve myself that is why I have laid low like this. You know when I was in secondary school the biology teacher told us that for a man to have sexual intercourse with a woman what comes out of the man's body (i.e. the ejaculate) if care is not taken the nutrients you lose you will not recover for a month especially if your diet is not rich. So, I always remember this. With my illness I don't want to be losing precious nutrients through sexual intercourse. You know that sperm forms half of a whole human being, so it must be rich in nutrients. Men lose a lot of nutrients through sperm ejaculation. This also affects the CD4 count. As I am now, I can run from here to Kano Line (about 15 km) and back. Although I am 53 years old, I am stronger than forty something year olds. See my body, how can you

know that I am HIV-positive, if I didn't tell you? This is because I preserve myself by reducing sexual frequency."(Jaimo, 53 year old widower).

The reason offered for abstinence by some of the men was to avoid divine retribution. They believed that this would be the consequence for infecting their sexual partners:

"In my religion anyone who infects another with an ailment leading to the person's death, he is directly responsible for that person's death. So, I don't want to be responsible for killing any person." (Sulai, 31 year old unmarried man).

A few other men were interested in sexual intercourse, but their sero-discordant partners were unwilling to take the risk. This led to decreased coital frequency or abstinence:

"My (HIV-negative) wife became completely disinterested in sexual intercourse. So, I have been patient with her until she shows the slightest interest. I am still very much interested but she is not and I think she is afraid that I will infect her." (Gajere, 38 year old married man, sero-discordant spouse).

For some men, a combination of factors was responsible. For example, one man avoided sexual intercourse to protect his spouse and himself from pre-mature death. In addition, he didn't want their children to be orphaned. However, abstinence among married men sometimes precipitated marital disharmony or even divorce. This was especially so when the partner wanted a child. Explaining his experience when he attempted to abstain, a man said:

"It is out of fear of infecting my wife with HIV that I started avoiding sex. I don't want to infect her. It could lead to our death leaving our children as orphans. Initially she promised that she will stay even without sex but she later changed her mind. I don't know if she changed her mind herself or she was influenced by others. She came to me and insisted that she wanted to have another child, but she doesn't want me to infect her, so she demanded a divorce. After some heated arguments she left for her parents' house. Now she is gone…" (Danjuma, 35 year old man, Monogamous).

The practice of polygamy complicated matters. Some of them re-worked their marriage terms to avoid infecting the HIV-negative partners. This included forfeiture of marital sexual rights:

"I have stopped having sexual relations with my first wife since she tested HIV- negative while I am HIV-positive. She also agreed that while remaining married; we should abstain from sexual intercourse so that I don't infect her. I married my second wife knowing that she is HIV-positive just like me and we have continued to have sex with her (the second wife)." (Dogo, 60 year old married man, polygamous).

Fear of infecting their sexual partners with HIV, psychological effects of HIV-positive status, apprehension about spiritual retribution and unwillingness of partners to take risks were the main reasons for reduced sexual activity and abstinence among HIV-positive men. Other

reasons were the associated energy expenditure and perceived nutrient loss in semen. The next section describes the pattern of risky sexual behaviour among HIV-positive men.

6.4 Comparing libido and sexual activity among HIV-positive men and controls

From the quantitative survey data, a higher proportion of controls (21.1%) rated their libido 'high' compared to HIV-positive men post-diagnosis (10.7%) (P<0.05). Most HIV-positive men (83.3%) considered their libido 'average' (Table 6.8).

Table 6.8 Post-diagnosis libido of HIV-positive men compared to controls

Attribute	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Libido	High	57(21.1)	29(10.7)
	Average	185(68.5)	225(83.3)
	Low	28(10.4)	16(6)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square	P<0.001	

The proportion of HIV-positive men who remained sexually active after the positive HIV test (91.9%; n=248) was significantly higher than the proportion of sexually active controls (82.2%; n=222) (P<0.05) (Table 6.9).

Table 6.9 Post-diagnosis sexual activity of HIV-positive men compared to controls

Attribute	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Sexual activity	Abstinent	48(17.8)	22(8.1)
	Sexually active	222(82.2)	248(91.9)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square test	P<0.05	

In summary, the proportion of HIV-positive men (83.3%) that rated their libido as 'average' after diagnosis was significantly higher than controls (68.5%). Similarly, the level of reported sexual activity showed that most HIV-positive men remained sexually active post-diagnosis. In addition, the reported proportion of abstinent men was significantly higher among controls. The next section identifies factors associated with sexual activity at bivariate level followed by predictors of sexual activity among HIV-positive men and controls.

6.5 Factors associated with sexual activity among HIV-positive men and controls

In the section, quantitative data and qualitative interview themes are used to identify factors influencing sexual activity among HIV-positive men and controls.

Factors associated with sexual activity among HIV-positive men and controls

At bivariate level, sexual activity among HIV-positive men was significantly associated with marital status, education, age, employment status, number of living children and reproductive intention and duration of diagnosis. (P<0.05) (Tables 6.10 to 6.23). Among controls, sexual activity was associated with the same factors (marital status, education, age, employment status, number of living children and reproductive intention) (P<0.05), except duration of diagnosis which is not applicable to them (Tables 6.10 to 6.23).

Table 6.10: Association between ethnicity and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Ethnicity	Sexually active	Abstinent	Sexually active	Abstinent
Hausa/Fulani	192 (92.3)	16 (7.7)	174 (81.3)	40 (18.7)
Yoruba	10 (90.9)	1 (9.1)	5 (71.4)	2 (28.6)
Igbo	28 (93.3)	2 (6.7)	25 (89.3)	3 (10.7)
Others	18 (85.7)	3 (14.3)	18 (85.7)	3 (14.3)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
χ2=1.87, p=0.76			χ2=3.3, p=0.51	

Table 6.11: Association between marital status and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Marital status	Sexually active	Abstinent	Sexually active	Abstinent
Single	24 (54.5)	20 (45.5)	7 (12.7)	48 (87.3)
Ever married	224 (99.1)	2 (0.9)	215 (100.0)	-
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001*	

Table 6.12: Association between marital duration and sexual activity

	HIV-positive men (N=223) Frequency n (%)		Control (N=215) Frequency n (%)	
Marital duration	Sexually active	Abstinent	Sexually active	Abstinent
<10	65 (98.5)	1 (1.5)	126 (100.0)	-
≥10	157 (100.0)	-	89 (100.0)	-
Total	222 (99.6)	1 (0.4)	215 (100.0)	-
Fisher's exact, p=0.3			Fisher's exact, p=1.0	

Table 6.13: Association between education and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Education	Sexually active	Abstinent	Sexually active	Abstinent
No formal	78 (98.7)	1 (1.3)	70 (88.6)	9 (11.4)
Primary	38 (95.0)	2 (5.0)	33 (80.5)	8 (19.5)
Secondary	72 (81.8)	16 (18.2)	62 (71.3)	25 (28.7)
Tertiary	60 (95.2)	3 (4.8)	57 (90.5)	6 (9.5)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
$\chi 2$=18.3, p<0.0001*			$\chi 2$= 12.4, p=0.006*	

Table 6.14: Association between age and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Age Group	Sexually active	Abstinent	Sexually active	Abstinent
<30	70 (77.8)	20 (22.2)	68 (58.6)	48 (41.4)
≥30	178 (98.9)	2 (1.1)	154 (100.0)	-
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001*	

Table 6.15: Association between religion and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Religion	Sexually active	Abstinent	Sexually active	Abstinent
Islam	201 (92.6)	16 (7.4)	179 (81.7)	40 (18.3)
Christianity	47 (88.7)	6 (11.3)	43 (84.3)	8 (15.7)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p=0.40			Fisher's exact, p=0.84	

Table 6.16: Association between employment status and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Employment	Sexually active	Abstinent	Sexually active	Abstinent
Unemployed	7(31.8)	15 (68.2)	3 (7.7)	36 (92.3)
Employed	241 (97.2)	7 (2.8)	219 (94.8)	12 (5.2)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001	

Table 6.17: Association between number of children and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Number of children	Sexually active	Abstinent	Sexually active	Abstinent
0-4	28 (58.3)	20 (41.7)	19 (28.4)	48 (71.6)
≥5	220 (99.1)	2 (0.9)	203 (100.0)	-
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001	

Table 6.18: Association between reproductive intention and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Reproductive intention	Sexually active	Abstinent	Sexually active	Abstinent
Yes	149 (96.8)	5 (3.2)	181 (100.0)	-
No	99 (85.3)	17 (14.7)	41 (46.1)	48 (53.9)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
Fisher's exact, p=0.0011*			Fisher's exact, p<0.0001	

Table 6.19: Association between duration of diagnosis and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Duration of diagnosis	Sexually active	Abstinent	Sexually active	Abstinent
≤1 year	50 (84.7)	9 (15.3)	Not Applicable	
>1 year	198 (93.8)	13 (6.2)		
Total	248 (91.9)	22 (8.1)		
Fisher's exact, p=0.047*				

Table 6.20: Association between spousal serodiscordance and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Serodiscordance (spousal)		Sexually active	Sexually active	Abstinent
Abstinent				
Yes	120 (100.0)	-	Not Applicable	
No	158 (98.1)	3 (1.9)		
Total	248 (91.9)	22 (8.1)		
Fisher's exact, p=0.26				

Table 6.21: Association between perceived chance of transmission and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Perceived chance of transmission without condom	Sexually active	Abstinent	Sexually active	Abstinent
Very high	17 (81.0)	4 (19.0)	44(75.9)	14(24.1)
High	167 (92.3)	14 (7.7)	167(83.5)	33(16.5)
Average	9(100.0)	-	10(90.9)	1(9.1)
Low	55 (93.2)	4 (6.8)	1(100.0)	-
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
$\chi 2$=3.84, p=0.15			$\chi 2$=2.56, p=0.28	

Table 6.22: Association between chance of transmission on ART and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Chance of transmission on ART	Sexually active	Abstinent	Sexually active	Abstinent
Higher	60 (88.2)	8 (11.8)	6 (75.0)	2 (25.0)
Same	101 (92.7)	8 (7.3)	56 (90.3)	6 (9.7)
Lower	87 (93.5)	6 (6.5)	2 (100.0)	-
Don't know	-	-	158 (79.8)	40 (20.2)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
χ2=1.64, p=0.44			χ2=3.74, p=0.15	

Table 6.23: Association between chance of transmission on PrEP and sexual activity

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
Chance of transmission on PrEP	Sexually active	Abstinent	Sexually active	Abstinent
Higher	58 (87.9)	8 (12.1)	4 (80.0)	1 (20.0)
Same	113 (92.6)	9 (7.4)	57 (90.5)	6 (9.5)
Don't know	77 (93.9)	5 (6.1)	161 (79.7)	41 (20.3)
Total	248 (91.9)	22 (8.1)	222 (82.2)	48 (17.8)
χ2=1.95, p=0.38			χ2=3.48, p=0.062	

6.5.1. Predictors of sexual activity

Predictors of sexual activity among HIV positive men and controls

Using the combined dataset for HIV-positive men and controls (N=540), a binary logistic regression model adjusting for confounders (marital duration, education) showed that HIV status, age, marital status, employment and reproductive intention remained significant predictors of sexual activity among HIV-positive men and controls (Table 6.24). Specifically, there was a 10% increased likelihood of being sexually active among HIV-positive men compared to controls and over 20% increased chance of sexual activity among older respondents (≥30 years) relative to their younger counterparts. Similarly, married and employed men were more than twice and over three times likely to be sexually active, respectively. Furthermore, men who intent to have a child in three years were more than 30% likely to be sexually active.

Table 6.24: Logistic regression model for predictors of **sexual activity** among **HIV-positive men and controls** in Kano, Nigeria

Characteristics	N=540 Sexually active* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	*P* value
Age group				
<30	138 (67.0)	Ref		
≥30	332 (99.4)	1.48 (1.35-1.63)	1.22 (1.13-1.40)	0.032†
HIV status				
HIV-positive	248 (91.9)	1.12 (1.05-1.19)	1.10 (1.03-1.16)	0.021†
Control	222 (82.2)	Ref		
Marital status				
Single	31 (31.3)	Ref		
Ever married	439 (99.5)	3.18 (2.37-4.26)	2.31 (1.62-3.59)	0.01†
[β]*Marital duration (years)*				
<10	181 (99.5)	Ref		
≥10	146 (100.0)	1.01 (0.99-1.02)	0.92 (0.73-1.01)	0.64
Education				
No formal	148 (93.7)	1.01 (0.95-1.07)	0.82 (0.61-1.04)	0.39
Primary	71 (87.7)	0.94 (0.86-1.04)	0.71 (0.58-1.03)	0.58
Secondary	134 (76.6)	0.82 (0.75-0.91)	0.64 (0.42-1.61)	0.76
Post-secondary	117 (92.9)	Ref		
Employment				
Unemployed	10 (16.4)	Ref		
Employed	460 (96.0)	5.86 (3.32-10.33)	3.27 (2.67-7.38)	0.01†
Intents to have child in next 3 years				
Yes	346 (99.1)	1.53 (1.37-1.70)	1.34 (1.16-1.49)	0.029†
No	124 (64.9)	Ref		

*Had penetrative vaginal intercourse in the preceding 6 months;
†Significant at $P<0.05$; OR: Odds Ratio, CI: confidence interval; Ref: reference group
[β] Only for married respondents (N=438)

Predictors of sexual activity among HIV-positive men

A separate binary logistic regression model for HIV-positive men (N=270) adjusting for socio-demographic (age, ethnicity, religion, education, fertility intention) and HIV-related (duration of diagnosis, perceived transmission risk and serodiscordant spouse) factors showed that marital status and employment were significant predictors of sexual activity (Table 6b). Specifically, married HIV-positive men had more than 50% increased chance of being sexually active compared to those that were single. Similarly, employed HIV-positive men had more than two-fold increased likelihood of being sexually active relative to their unemployed counterparts.

Table 6.25: Logistic regression model for predictors of **sexual activity** among **HIV-positive men** in Kano, Nigeria

Characteristics	N=270 Sexually active* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	*P* value
Age group				
<30	70 (77.8)	Ref		
≥30	178 (98.9)	1.27 (1.14-1.42)	1.19 (0.89-1.36)	0.53
Ethnicity				
Hausa/Fulani	192 (92.3)	1.08 (0.90-1.29)	0.63 (0.77-1.12)	0.48
Yoruba	10 (90.9)	1.06 (0.82-1.37)	0.82 (0.46-1.29)	0.72
Igbo	28 (93.3)	1.09 (0.89-1.33)	0.53 (0.38-1.27)	0.34
Others	18 (85.7)	Ref		
Religion				
Islam	201 (92.6)	1.04 (0.94-1.16)	0.78 (0.62-1.12)	0.92
Christianity	47 (88.7)	Ref		
Marital status				
Single	24 (54.5)	Ref		
Ever married	224 (99.1)	1.82 (1.39-2.38)	1.56 (1.18-2.27)	0.019†
Education				
No formal	78 (98.7)	1.04 (0.98-1.10)	0.58 (0.35-1.06)	0.21
Primary	38 (95.0)	0.99 (0.91-1.09)	0.75 (0.47-1.03)	0.93
Secondary	72 (81.8)	0.86 (0.77-1.39)	0.46 (0.58-1.28)	0.57
Post-secondary	60 (95.2)	Ref		
Employment				
Unemployed	7 (31.8)	Ref		
Employed	241 (97.2)	3.05 (1.66-5.63)	2.39 (1.45-4.26)	0.016†
Duration of diagnosis (years)				
≤1	50 (84.7)	Ref		
>1	198 (93.8)	1.11 (0.98-1.24)	0.79 (0.63-1.13)	0.18
Perceived transmission risk without condoms				
High	193 (91.5)	Ref		
Low	55 (93.2)	1.02 (0.94-1.10)	0.96 (0.73-1.05)	0.46
Serodiscordance				
Yes	120 (100.0)	1.03 (0.99-1.05)	0.57 (0.68-1.01)	0.36
No	89 (97.8)	Ref		
Intents to have child in next 3 years				
Yes	124 (98.2)	1.13 (1.05-1.23)	1.06 (0.87-1.19)	0.12
No	83 (81.4)	Ref		

*Had penetrative vaginal intercourse in the preceding 6 months;
†Significant at $P<0.05$; OR: Odds Ratio, CI: confidence interval; Ref: reference group

Marital status

The significant prediction of sexual activity by marital status among HIV-positive men was supported by themes from qualitative interviews. Two reasons emerged for increased likelihood of sexual activity among married HIV-positive men; the availability of a sex partner and sexual intercourse being considered a marital obligation. A man explains how most married HIV-positive men viewed sexual intercourse as a conjugal obligation:

"At present I have lost interest in sexual intercourse, I grudgingly do it just for the sake of my wife and as a marriage responsibility. I cannot sustain the intercourse beyond a few minutes now. But you know women want it to last longer, but I just can't do it. May be we now have sex once or twice maximum in a month and this is just so that my wife will not cause trouble for me and our marriage would continue." (Danjuma, 35 year old married man, monogamous).

Employment

The predictive role of employment status on sexual activity could be related to health status and income. HIV-positive men that remain in employment are more likely to be feeling healthier and have income that could support a family. As earlier stated, sexual intercourse is seen as an obligation among married men.

The qualitative interview themes also showed that some married HIV-positive men abstained for a period or decreased their coital frequency despite their spouse's desire to procreate. This had severe consequences for the marriage:

"I started avoiding sex giving all sorts of excuses. However, the real reason was that I didn't know if there is any way that (pregnancy) could be achieved without getting her infected with HIV. Even if ways existed I don't think we can afford it. If she was convinced that there was a way, it would have prevented this divorce. Also you know she is still young and having two children is far from enough in northern Nigeria." (MallamWaine, 38 year old divorced man).

6.6 Sexual risk behaviour among HIV-positive men before and after diagnosis

6.6.1 Number of sexual partners before and after HIV-positive diagnosis

The proportion of HIV-positive men who reported having (>1) sexual partners before diagnosis (34.1%; n=92) was significantly higher than those who reported same post-HIV diagnosis (20.8%; n=56) (P<0.05).

6.6.2 Condom use before and after HIV-diagnosis

The proportion of HIV-positive men who reported consistent condom use before the positive test (9.6%; *n*=26) was significantly lower than those who reported same after testing positive (18.9%; *n*=51) (*P*<0.05).

6.7 Comparing risky sexual behaviour between HIV-positive men and controls

The dimensions of risky sexual behaviour assessed during quantitative and qualitative phases of this study include number of sexual partners, consistent condom use and partner serodiscordance in the preceding six months.

6.7.1 Number of sexual partners

The proportion of HIV-positive men who had (>1) reported sexual partners after diagnosis (20.8%, *n*=56) was significantly higher than those reported by controls (16.6%, *n*=45) (*P*<0.05). However, most multiple sexual partnerships were within wedlock in both groups (Table 6.26).

Table 6.26 Comparison of risky sexual behaviour between HIV-positive men and controls

Risky behaviour	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Number of sexual partners in the preceding 6 months	None	48(17.8)	22(8.1)
	1	177(65.6)	192(71.1)
	2	37(13.6)	45(16.7)
	≥3	8(3.0)	11(4.1)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square test	*P*=0.023	
Condom use	Always	35(13.0)	51(18.9)
	Occasionally	61(22.6)	131(48.5)
	Never	174(64.4)	88(32.6)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square test	*P*<0.001	

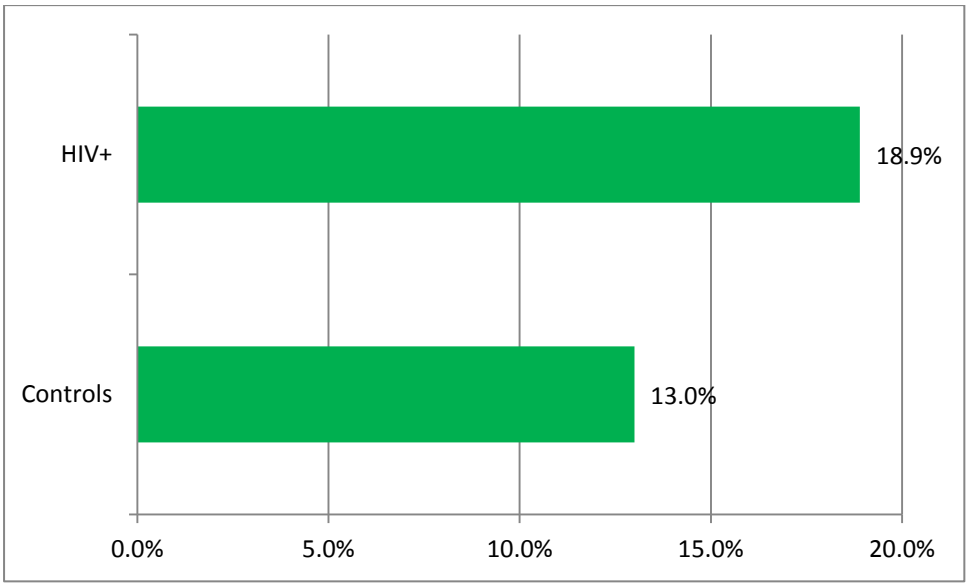
During qualitative interviews some HIV-positive men indicated that following diagnosis, they had limited themselves to their marital partner(s). This was not the case before the test. Out of fear of divine retribution, some also became hesitant in expanding their sexual network:

"I have become more careful. I have also restricted myself to my wife as far as sexual issues are concerned. Even now more than three women have approached me showing their interest in relationship or marriage. I have been hesitant. And I have not involved myself with them sexually, because of fear of God. I don't want to infect them with HIV and they also don't know my HIV status." (Jobdi, 44 year old married man, monogamous).

6.7.2 Condom use

Drawing on survey data and qualitative interviews the pattern of condom use between HIV-positive men and controls is now compared. Compared to controls, a higher proportion of HIV-positive men reported consistent use of condoms post-diagnosis (18.9% vs. 13.0%, $P<0.05$) (Figure 6.1).

Figure 6.1 Consistent condom use among HIV-positive men compared to controls



6.7.3 Condom use and partner's serostatus

Two hundred and nine (77.4%) of the 270 HIV-positive men knew the HIV status of their spouses. Of those who knew their spouses' HIV status, 89/209 (42.6%) had HIV-positive spouses while 120/209 (57.4%) had HIV-negative spouses. Only six of the 89 (6.7%) HIV-positive men with HIV-positive spouses used condoms consistently against 33 out of 120 (27.5%) HIV-positive men with HIV-negative spouses. This difference was significant ($p<0.05$) (Table 6.27).

Table 6.27: Condom use among HIV-positive men by spouse's serostatus

Spouse's serostatus	Consistent condom use Frequency (%) Yes	No	Total
HIV-positive	6 (6.7)	83 (92.3)	89 (100.0)
HIV-negative	33 (27.5)	87 (72.5)	120 (100.0)
Total	39 (18.7)	170 (81.3)	209 (100.0)
χ^2=13.2, p=0.00028			

6.7.4 Reasons for not using condoms

From survey results, the majority of HIV-positive men ascribed their low condom use to: lack of interest in condoms (79.0%), reduced pleasure (12.8%), partner's refusal (3.5%), spousal's desire to conceive (3.5%) and the fact that the partner was already HIV-positive (1.2%). Most controls (83%) stated that they want to have more children and felt condoms had no place in stable marital relationships.

This was buttressed during qualitative interviews. For instance, a man wondered why anyone could suggest the use of condoms with his legally married spouse. He was of the view that condoms were to be used only with prostitutes or if one engaged in extra-marital affairs and was afraid of unwanted pregnancy:

"I don't use condoms because the women I have sex with are my legally married wives under Islamic Law. I am not committing adultery nor am I having sex with prostitutes. If they become pregnant it is a legitimate child and very much welcome. So why should I use condoms?" (HabuFari, 43 year old married, polygamous).

Another man complained of erectile failure whenever he attempted using condoms. However, he had no problems if he didn't use condoms. Others felt decreased sensation and pleasure whenever they used condoms:

"They use to give us condoms but we don't use it because anytime I attempt to put it on my penis, it loses its strength and fell flat. I also don't feel intense sexual arousal when using condom. Sex becomes less enjoyable. But without the condom my penis will be very strong and my performance excellent. This is why I don't like using condoms." (Jobdi, 44 year old married, monogamous).

Another reason for avoiding condom was its tightness and physical irritation on the penis. Study participants also questioned the need for condoms use when they are both infected and wanted to conceive:

"We discontinued condoms because it was giving us some boils on my private part. My wife and I discussed about this. She said since I am HIV- positive and she is also HIV- positive we should discontinue using it. And when we stopped, we now have a baby who is even HIV-negative." (Liman, 49 year old married man, currently monogamous).

Another man re-iterated this point:

'There was a time I wore a condom and it compressed my penis so tight. Since that experience, I have abandoned the use of condoms. Also, since we are both positive with the second wife, we have not even thought about using condoms, what's the use? (Dogo, 60 year old, Polygamous).

Furthermore, some respondents believed that condoms were laced with harmful substances. This point was well articulated by a respondent who seemed to be convinced by conspiracy theories:

"With the powder and oil in the condoms, I suspect it has something hidden within it to cause harm. I do not even trust fizzy bottled drinks manufactured in the west. I suspect there are harmful ingredients in them because of this, I have never used condoms…". (Ibrahim, 42 year old married man, serodiscordant partner).

Among some couples, multiple factors played out against condom use. For instance, already challenged by low libido, a man with a sero-concordant spouse who also wanted children wondered why he should be asked to use condoms:

"*You know we are both HIV-positive and my libido is low, we also want babies, so why should we use condoms*?" *(Danjuma, 35 year old married, monogamous).*

In the same vein, another HIV-sero-concordant couple who experienced infertility for years were surprised about the advice to use condoms:

"I really don't know why they (health workers) *said we should use condoms now that we are both HIV-positive and eager to have a child. Even without using the condom we were unable to conceive for so many years. What more of when we use condoms?" Jobdi, (44 year old married man, monogamous).*

In contrast, some men even used double condoms to ensure that their partners are well protected:

"You know it is not easy for a man to stay without a woman just like that. My concern is I don't want to cheat a woman and infect her with HIV since I know that I am infected. ....Even if I am going to have sex now I wear two condoms for double protection and to be sure I don't infect the woman. If one of the condoms breaks the other one will still protect. If it is only one when it breaks, that is trouble…" (Jaimo, 53 year old widower).

Most men erroneously considered condoms unnecessary when spouses are also HIV-positive. Surprisingly, the only man who thought otherwise provided cogent reasons why sero-concordant couples should also use condoms consistently:

"Since we were not born together, we had different life experiences, also the HIV I have may be different from the one that she has. No one knows which one is stronger and hence more dangerous. So this was the reason why we used condoms to protect each other from getting the type of virus in the other person. However, when we wished to get a baby or we ran out of condoms then we do it without condoms." (Atiku, 33 year old divorced man).

There was concordance in responses regarding condom use from the two phases of the study. It is apparent that some men's apathy towards condoms stems from several factors. Firstly, there was perceived decrease in sexual pleasure which was uppermost in some men's minds overriding the need to protect their partners and self from re-infections. This apparent clash between emotions and risk perception remains a major challenge that requires to be addressed to reduce condomless sex. Secondly, conspiracy theories found many sympathizers. For instance, there was the belief that condoms are deliberately laced with harmful substances as a ploy for population control.

6.7.5 Awareness of partner's HIV status

Using survey data and qualitative interviews, HIV-serostatus disclosure and serodiscordance were determined among HIV-positive men and controls. All study participants had their serostatus confirmed before enrolment on ART. In contrast, less than a third (32.2%, *n*=87) of the controls have ever been tested for HIV. Those that have been tested were all HIV-negative. The rest of the controls (67.8%, *n*=183) have never been tested for HIV.

Of the 223 married HIV-positive men, an overwhelming majority (93.7%, *n*=209) knew the serostatus of their spouses. In contrast, of the 215 married controls, less than a third (32.1%, *n*=69) were aware of their spouses' HIV serostatus.

6.7.6 Serodiscordance

Of the 209 married HIV-positive men who knew the serostatus of their spouses, less than half (42.6%, *n*=89) reported having seroconcordant partner/partners while over half (57.4%, *n*=120) had serodiscordant partner/partners. In contrast, of the 69 controls who knew their spouse's HIV status, all (100%, *n*=69) reported having seronegative spouses. It is noteworthy that a majority of married controls (67.9%, *n*=146) and their spouses had not been tested for HIV.

Qualitative interviews confirmed the existence of sero-discordant couples and some men's hesitation to disclose their status to their spouses:

"Definitely there are serodiscordant couples. You will see a man testing positive but the wife is negative or vice versa. Both types occur. Most times if it is the man that is positive, he hides his HIV status and they live like that until he dies or the woman gets infected. Some women come to know the status of their husbands and demand for divorce if they are still negative. In contrast, if it is the women that first test positive usually at antenatal clinics, they inform and invite their husbands to go for the test. When the men test negative they tend to divorce the women…." (Ado, 36 year old married man, monogamous).

6.8 Prevalence of risky sexual behaviour among HIV-positive men and controls

A higher proportion of the HIV-positive men 220 (81.5%) engaged in risky sexual behaviour in the preceding six months compared to 60 (22.0%) of controls ($P<0.05$).

6.9 Factors associated with risky sexual behaviour among HIV-positive men and controls

Among HIV-positive men, the factors associated with risky sexual behaviour at bivariate level were ethnicity, marital status, marital duration, education, religion, number of living children and serodiscordance ($P<0.05$) (Tables 6.28 to 6.39). Among controls, risky sexual behaviour was also associated with ethnicity, marital status, education, age, religion, employment status and reproductive intention ($P<0.05$) (Tables 6.28 to 6.39). The factors (ethnicity, marital status, education and religion) were common to both HIV-positive men and controls.

Table 6.28: Association between ethnicity and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexual behaviour	
Ethnicity	Yes	No	Yes	No
Hausa/Fulani	181 (87.0)	27 (13.0)	38 (17.8)	176 (82.2)
Yoruba	5 (45.5)	6 (54.5)	2 (28.6)	5 (71.4)
Igbo	18 (60.0)	12 (40.0)	11 (39.3)	17 (60.7)
Others	16 (76.2)	5 (23.8)	9 (42.9)	12 (57.1)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
$\chi 2=18.4$, p<0.0001*			$\chi 2=11.9$, p=0.001*	

Table 6.29: Association between marital status and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Marital status	Yes	No	Yes	No
Single	43 (97.7)	1 (2.3)	3 (5.5)	52 (94.5)
Ever married	177 (78.3)	49 (21.7)	57 (26.5)	158 (73.5)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
Fisher's exact, p=0.005*			Fisher's exact, p=0.0015*	

Table 6.30: Association between marital duration and risky sexual behaviour

	HIV-positive men (N=223) Frequency n (%) Risky sexually behaviour		Control (N=215) Frequency n (%) Risky sexually behaviour	
[β]Marital duration (years)	Yes	No	Yes	No
<10	41 (62.1)	25 (37.9)	35 (27.8)	91 (72.2)
≥10	134 (85.4)	23 (14.6)	22 (24.7)	67 (75.3)
Total	175 (78.5)	48 (21.5)	57 (26.5)	158 (73.5)
$\chi 2=13.5$, p<0.00024* β Only for married respondents			$\chi 2=0.12$, p<0.73	

Table 6.31: Association between education and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Education	Yes	No	Yes	No
No formal	75 (94.9)	4 (5.1)	7 (8.9)	72 (91.1)
Primary	32 (80.0)	8 (20.0)	4 (9.8)	37 (9.0)
Secondary	71 (80.7)	17 (19.3)	24 (27.6)	63 (72.4)
Tertiary	42 (66.7)	21 (33.3)	25 (39.7)	38 (60.3)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
$\chi 2=18.7$, p<0.0001*			$\chi 2=24.4$, p<0.0001*	

Table 6.32: Association between age and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Age Group	Yes	No	Yes	No
<30	73 (81.1)	17 (18.9)	13 (11.2)	103 (88.8)
≥30	147 (81.7)	33 (18.3)	47 (30.5)	107 (69.5)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
χ2= 0.012, p=0.91			χ2=13.2, p=0.0003*	

Table 6.33: Association between religion and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Religion	Yes	No	Yes	No
Islam	188 (86.6)	29 (13.4)	40 (18.3)	179 (81.7)
Christianity	32 (60.4)	21 (39.6)	20 (39.2)	31 (60.8)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
Fisher's exact, p<0.0001*			Fisher's exact, p=0.0023*	

Table 6.34: Association between employment status and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Employment	Yes	No	Yes	No
Unemployed	21 (95.5)	1 (4.5)	1 (2.6)	38 (97.4)
Employed	199 (80.2)	49 (19.8)	59 (25.5)	172 (74.5)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
Fisher's exact, p=0.089			Fisher's exact, p=0.0006*	

Table 6.35: Association between number of children and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) Risky sexually behaviour		Control (N=270) Frequency n (%) Risky sexually behaviour	
Number of children	Yes	No	Yes	No
0-4	47 (97.9)	1 (2.1)	9 (13.4)	58 (86.6)
≥5	173 (77.9)	49 (22.1)	51 (25.1)	152 (74.9)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
Fisher's exact, p=0.0025*			Fisher's exact, p=0.061	

Table 6.36:Association between reproductive intention and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) **Risky sexually behaviour**		Control (N=270) Frequency n (%) **Risky sexually behaviour**	
Intents to have a child	Yes	No	Yes	No
Yes	124 (80.5)	30 (19.5)	55 (30.4)	126 (69.6)
No	96 (82.8)	20 (17.2)	5 (5.6)	84 (94.4)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
χ2= 0.097, p=0.76			χ2= 19.8, p<0.0001*	

Table 6.37: Association between duration of HIV diagnosis and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) **Risky sexually behaviour**		Control (N=270) Frequency n (%) **Risky sexually behaviour**	
Duration of diagnosis	Yes	No	Yes	No
≤1 year	49 (83.1)	10 (16.9)	Not Applicable	
>1 year	171 (81.0)	40 (19.0)		
Total	220 (81.5)	50 (18.5)		
Fisher's exact, p=0.85				

Table 6.38: Association between (spousal) serodiscordance and risky sexual behaviour

	HIV-positive men (N=209) Frequency n (%) **Risky sexually behaviour**		Control (N=270) Frequency n (%) **Risky sexually behaviour**	
Serodiscordant (Spouse)	Yes	No	Yes	No
Yes	87 (72.5)	6 (6.7)	Not Applicable	
No	83 (92.3)	33 (27.5)		
Total	170 (81.3)	39 (18.7)		
χ2=15.0, p=0.0001*				

Table 6.39: Association between perceived chance of transmission and risky sexual behaviour

	HIV-positive men (N=270) Frequency n (%) **Risky sexually behaviour**		Control (N=270) Frequency n (%) **Risky sexually behaviour**	
Perceived chance of transmission without condom	Yes	No	Yes	No
Very high	18 (85.7)	3 (14.3)	11 (19.0)	47 (81.0)
High	145 (80.1)	36 (19.9)	47 (23.5)	153 (76.5)
Average	6 (66.7)	3 (33.3)	2 (18.2)	9 (81.8)
Low	51 (86.4)	8 (13.6)	-	1 (100.0)
Total	220 (81.5)	50 (18.5)	60 (22.2)	210 (77.8)
χ2=2.75, p=0.43			χ2=0.76, p=0.68	

6.10 Predictors of risky sexual behaviour among HIV-positive men and controls

Fitting a binary logistic regression model on the combined dataset for HIV-positive men and controls (N=540) and adjusting for confounders (age, marital status and duration, ethnicity, education, religion, number of living children and reproductive intention) showed that HIV status, age and employment status were significant predictors of risky sexual behaviour among HIV-positive men and controls (Table 6.40). Specifically, being HIV-positive increased men's chance of risky sexual behaviour by nearly three-folds. Similarly, older men (≥30 years) and being employed increased the likelihood of risky sexual behaviour by 51% and 33% respectively.

Table 6.40: Logistic regression model for predictors of **risky sexual behaviour** among **HIV-positive men and controls** in Kano, Nigeria

Characteristics	N=540 Engaged in risky sexual behaviour* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	*P* value
Age group				
<30	86 (41.7)	Ref		
≥30	194 (58.1)	1.93 (1.36-2.75)	1.51 (1.12-2.63)	0.028†
HIV status				
HIV-positive	220 (81.5)	3.67 (2.91-4.62)	2.74 (1.92-3.81)	0.017†
Control	60 (22.2)	Ref		
Marital status				
Single	46 (46.5)	Ref		
Ever married	234 (53.1)	1.14 (0.91-1.44)	0.92 (0.82-1.39)	0.36
Ethnicity				
Hausa/Fulani	219 (51.9)	Ref		
Yoruba	7 (38.9)	0.75 (0.42-1.35)	0.62 (0.31-1.25)	0.29
Igbo	29 (50.0)	0.96 (0.73-1.27)	0.75 (0.58-1.13)	0.37
Others	25 (59.5)	1.15 (0.88-1.50)	0.93 (0.63-1.42)	0.42
Marital duration (years)				
<10	76 (39.4)	Ref		
≥10	156 (63.4)	1.61 (1.32-1.97)	0.24 (0.87-1.73)	0.07
Education				
No formal	82 (51.9)	Ref		
Primary	36 (44.4)	0.86 (0.64-1.14)	0.73 (0.48-1.12)	0.52
Secondary	95 (54.3)	1.05 (0.85-1.28)	0.67 (0.52-1.17)	0.48
Post-secondary	67 (53.2)	1.02 (0.82-1.28)	0.91 (0.63-1.15)	0.27
Religion				
Islam	228 (52.3)	1.05 (0.85-1.29)	0.86 (0.74-1.13)	0.53
Christianity	52 (50.0)	Ref		
Employment				

Unemployed	22 (36.1)	Ref		
Employed	258 (59.3)	1.5 (1.06-2.11)	1.33 (1.02-1.92)	0.03†
Number of children alive				
≤4	56 (48.7)	Ref		
≥5	224 (52.7)	1.08 (0.88-1.33)	0.82 (0.73-1.23)	0.77
Intents to have child in next 3 years				
Yes	179 (53.4)	1.08 (0.91-1.29)	0.78 (0.62-1.14)	0.36
No	101 (49.3)	Ref		

*Had multiple (>1) sexual partners and/or condomless sex and/or serodiscordant partner or partner of unknown status) in the preceding 6 months;
†Significant at $P<0.05$; OR: Odds Ratio, CI: confidence interval; Ref: reference group

6.11 Predictors of risky sexual behaviour among HIV-positive men

Considering HIV-positive men alone (N=270), a binary logistic regression model adjusting for sociodemographic (age, ethnicity, education, employment, marital duration, reproductive intention) and HIV-related (perceived transmission risk and spousal serodiscordance) factors showed that risky sexual behaviour was predicted by religion, marital status and serodiscordance (Table 6.41). Specifically, there was 32% increased chance of risky sexual behaviour among HIV-positive men of Islamic faith compared to those who that were Christians. Also, single HIV-positive men had a 10% increased likelihood compared to their married colleagues. Furthermore, men with HIV-positive spouses had more than 20% increased likelihood of engaging in risky sexual behaviour.

Table 6.41: Logistic regression model for predictors of **risky sexual behaviour** among **HIV-positive men** in Kano, Nigeria

Characteristics	N=270 Engaged in risky sexual behaviour* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	*P* value
Age group				
<30	73 (81.1)	Ref		
≥30	147(81.7)	1.01 (0.89-1.14)	0.87 (0.53-1.10)	0.35
Ethnicity				
Hausa/Fulani	181 (87.0)	1.14 (0.89-1.46)	0.93 (0.72-1.32)	0.48
Yoruba	5 (45.5)	1.68 (0.84-3.34)	1.36 (0.66-2.53)	0.16
Igbo	18 (60.0)	1.27 (0.87-1.85)	1.15 (0.53-1.42)	0.62
Others	16 (76.2)	Ref		
Religion				
Christianity	32 (60.4)	Ref		
Islam	188 (86.6)	1.43 (1.15-1.80)	1.32 (1.04-1.61)	0.024†
Marital status				
Single	43 (97.7)	1.25 (1.15-1.35)	1.10 (1.01-1.57)	0.04†
Ever married	177 (78.3)	Ref		
Marital duration (years)				
<10	41 (61.2)	Ref		
≥10	134 (85.4)	1.39 (1.14-1.71)	0.93 (0.81-1.64)	0.13
Education				
No formal	75 (94.9)	1.42 (1.19-1.71)	1.21 (0.91-1.42)	0.37
Primary	32 (80.0)	1.20 (0.95-1.52)	0.82 (0.82-1.31)	0.16
Secondary	71 (80.7)	1.21 (0.99-1.48)	1.01 (0.86-1.27)	0.23
Post-secondary	42 (66.7)	Ref		
Employment				
Unemployed	21 (95.5)	1.19 (1.07-1.33)	0.91 (0.79-1.25)	0.14
Employed	199 (80.2)	Ref		
Perceived transmission risk without condoms				
High	169 (80.1)	Ref		
Low	51 (86.4)	1.08 (0.96-1.22)	0.92 (0.73-1.14)	0.27
Serodiscordance				
Yes	87 (72.5)	Ref		
No	83 (92.3)	1.31 (1.15-1.48)	1.24 (1.17-1.46)	0.021†
Intents to have a child				
Yes	124 (80.5)	0.97 (0.87-1.09)	0.76 (0.68-1.02)	0.29
No	96 (82.8)	Ref		

* Had multiple (>1) sexual partners and/or condomless sex and/or serodiscordant partner or partner of unknown status) in the preceding 6 months;

†Significant at *P*<0.05; OR: Odds Ratio, CI: confidence interval; Ref: reference group

6.12 Chapter Summary

Majority of the men rated their libido average before (80.0%) and after (84.1%) HIV-positive diagnosis and placement on ART. However, over a tenth (15.6%) of men reported high libido before diagnosis while 9.6% did so after the test. The rest rated theirs low at both times. These changes were not significant even on sub-group analysis by duration of diagnosis. This pattern also emerged from themes of the qualitative inquiry. It was unclear if the heightened libido reported by some men following the commencement of ART was due to improved health or a direct effect of the drugs.

Although the majority of HIV-positive men (91.9%) reported that they remained sexually active after diagnosis, there was a significant decline in coital frequency overall and among those diagnosed within the preceding year. Attempts at abstinence among married men precipitated marital disharmony or divorce. These changes in sexual behaviour were attributed to fear of infecting their partner and re-infections, psychological effect of HIV diagnosis, energy expenditure, advancing age and nutrient loss.

Despite these changes, the proportion of sexually active HIV-positive men was significantly higher than controls. Marital status and employment status were significant predictors of sexual activity among HIV-positive men. Condom use was generally low, but higher among HIV-positive men, particularly those with serodiscordant spouses. Lack of interest in condoms, misperceptions, genital irritation, decreased pleasure, conspiracy theories and desire to procreate were the main reasons for low condom use.

Although most sexual partners were within wedlock, a significantly higher proportion (20.8%) of HIV-positive men reported (>1) sex partners than controls (16.6%). In addition, over half of HIV-positive men had sero-discordant partners as against none among controls. The proportion of HIV-positive men who reported consistent condom use before the positive HIV test (9.6%) was significantly lower than those who reported same after testing positive (18.9%). Compared with controls (13.0%), a significantly higher proportion of HIV-positive men (18.9%) reported current consistent condom use. Specifically, a significantly higher proportion of men with serodiscordant spouses (27.5%) used condoms consistently compared to those with seroconcordant partners (6.7%). Religion, marital status and serodiscordant spouse predicted risky sexual behaviour among HIV-positive men.

HIV-positive diagnosis negatively impacted the sexual activity of men in terms of libido and coital frequency as a result of the psychological stress associated with the diagnosis, fear of infecting the partner and other factors. Although some claimed an increased libido following ART, there was no such statistical evidence. It is therefore clear that despite changes in sexual interest and activity following HIV-diagnosis, most men still engaged in sexual activities with very low condom use.

Chapter 7 Findings: Reproductive Behaviour of HIV-positive Men versus Controls

7.1 Introduction

This chapter draws on data from the quantitative survey and qualitative interviews to describe the reproductive behaviour of HIV-positive men and matched controls. The first section compares the number of living children fathered by HIV-positive men and controls. It is followed by a description of HIV-positive men's fertility desire and intention and how these compare with controls. Furthermore, the influences of living with HIV on fertility desire and intention of HIV-positive men are elicited given the prevailing culture and health care service challenges. The chapter answers the following research questions: (i) what is the reproductive behaviour of HIV-positive men? (ii) Are there changes in men's desire for fatherhood following HIV diagnosis? If there are, what are the motivations and reasons? (iii) How does the fertility desire and intention of HIV-positive men compare with matched controls?

7.1.1 Existing children

The median number of living children fathered by HIV-positive men, i.e. 5 (inter-quartile range=5), was similar to those of controls, i.e. 4 (inter-quartile range=5) (P>0.05) (Table 7.1).

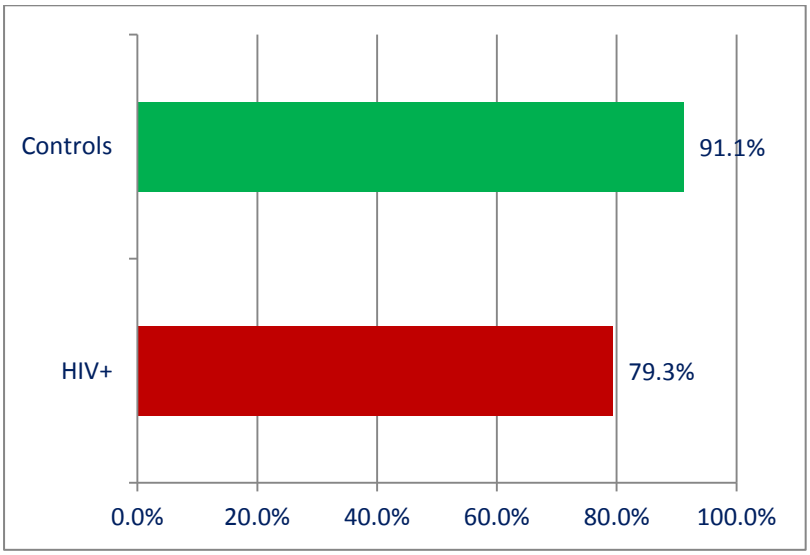
Table 7.1 Number of living children fathered by HIV-positive men and controls

	Frequency (%)		
Number of living children	**HIV-positive men**	**Controls**	**Total**
None	48 (17.8)	67 (24.8)	115 (21.3)
1-4	104 (38.5)	127 (47.0)	231 (42.8)
5-9	90 (33.3)	49 (18.1)	139 (25.7)
10-14	22 (8.1)	23 (8.5)	45 (8.3)
≥15	6 (2.2)	4 (1.5)	10 (1.9)
Total	**270 (100.0)**	**270 (100.0)**	**540 (100.0)**

7.2 Fertility desire

Compared to controls, a significantly lower proportion of HIV-positive men desired to have children in the future (79.3%, n=214 vs. 91.1%, n=246, P<0.05) (Figure 7.1).

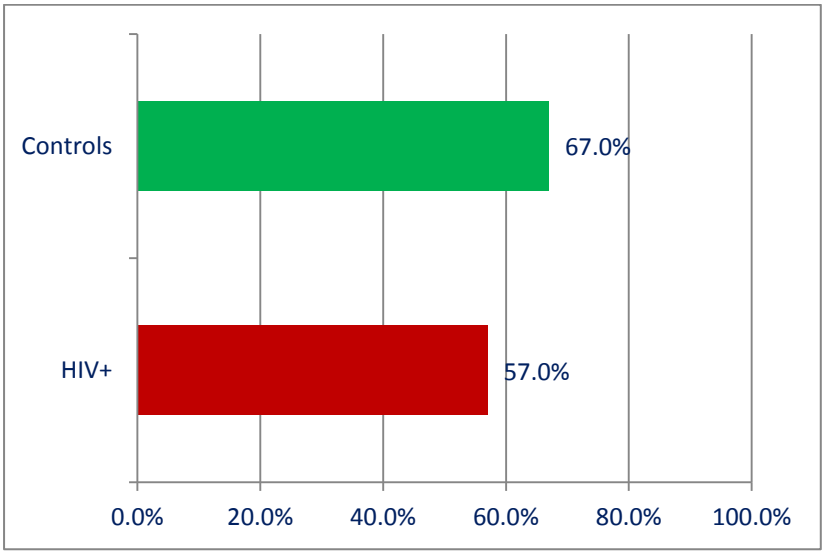
Figure 7.1 Comparison of fertility desire of HIV-positive men and controls



7.3 Fertility intention

A significantly lower proportion of HIV-positive men (57.0%, *n*=154) intend to have a child in the next three years compared to (67.0%, *n*=181) of controls (*P*<0.05) (Figure 7.2).

Figure 7.2 Fertility intentions (within 3 years) among HIV-positive men and controls



7.3.1 Awareness of PMTCT

Almost all HIV-positive men (98.5%, *n*=266) were aware of the PMTCT program compared to less than a third (28.5%, *n*=77) of controls (*P*<0.05).

7.3.2 Contraceptive use

Only (17%; *n*=46) of the partners of HIV-positive men and (15.2%; *n*=41) of those of controls used any form of modern contraception (Table 7.2).

Table 7.2 Contraceptive use among partners of HIV-positive men and controls

Current contraceptive use by partner(s)	**Frequency (%)**	
	Controls	**HIV-positive men (post-diagnosis)**
Yes	41(15.2)	46 (17.0)
No	229(84.8)	224 (83.0)
Total	**270 (100.0)**	**270 (100.0)**
Pearson's chi-square test	*P*=0.51	

Themes from qualitative interviews supported the survey findings. Although some men wanted a specific number of children, they felt that the final decision was outside their control. For instance, an inquiry on plans to have more children in the future elicited the following response:

"Of course yes, very much so. To my mind if I can have 10 or more I won't mind. But of course you know the final decision is pre-determined by God." (Danjuma, 35 year old married man, monogamous).

Some single men also declared their intention to bear children after marriage. However, some were already concerned about the risk of infecting their partners and children with HIV. A man was petrified by the prospects of having a HIV-positive child. He would prefer to be childless:

"This (fatherhood) thing is really a big issue. It is one of my major concerns now. I always come across children belonging to my friends, some to my junior brothers but I don't have any. I really like it when I see these young ones play and my desire for children gets heightened. My only dilemma is how to go about achieving this dream without harming the woman and the innocent child involved. My main fear is having a child who is HIV positive; I will prefer not to have any child rather than have a HIV-positive child because I have seen how children with HIV and their parents suffer. When I see such children, I feel sorry for them and I get a sense of pity." (Abubakar, 30 year old unmarried man).

7.4 Changes in fertility desire following HIV-positive diagnosis

The proportion of men who reported a decrease, unaltered and increased fertility desire following HIV-positive diagnosis were (20.7%; *n*=56), (63.7%; *n*=172) and (15.6%; *n*=42) respectively. Themes from qualitative interviews also confirmed that changes in fertility desire following HIV diagnosis were by no means unidirectional.

7.5 Reasons and motivations for fertility desire

Reasons for wanting fewer children

The first reason given for preferring fewer children revolved around concerns for the health of their spouses. They wanted to preserve their partner's health and ease the burden of child care on her. In light of this a man empathized with his partner's burden during pregnancy, childbirth and child rearing thus:

"Because my wife is also HIV-positive, you have to feel pity for them especially with HIV, pregnancy and child birth is a real challenge on the health of women." (Danjuma, 35 year old married man, monogamous).

Others cited the fear of transmitting HIV to their partners and infants as the reason why they wanted fewer children after testing positive to HIV:

"My main concern is that I don't want my wife to be infected in the process of getting pregnant or during delivery. Also, who wants to infect an innocent baby with HIV?" (Abdullahi, 33 year old married man with pregnant spouse).

For some men, the focus was on vertical transmission. One of them wanted to have five children initially, but being HIV-positive and faced with the risk of transmitting HIV to the infant made him change his mind. His desire is now conditional on the sero-status of the next child. If the child is HIV-negative, he intends to stop in order to avoid exposing more unborn babies to this risk:

"Even though children are from God, but in my own human thinking I had hoped for not more than five children before HIV came into my life. But now with this HIV-positive status of mine, if the child that my wife is currently carrying is delivered safely and HIV-negative, we can even stop at that one child. We don't want to expose an innocent soul to this enormous risk and suffering." (Dankanoma, 35 year old married man, monogamous).

For other men, economic factors were the underlying motive for limiting the number of children. They also wanted to take good care of the existing children:

"I do not desire additional children considering the number of children I have already and my limited resources. How do I fulfill my parental obligations on the ones I have talk less of any additional children? If I have not become sick with HIV I would have completed my house and desired more children since my religion encourages large family sizes." (55 year old married man, currently monogamous).

Another man wanted fewer children after testing positive to HIV because of the difficulties faced by parents of HIV-positive children and the challenges of orphan hood. He urged HIV-positive couples to adopt family planning and chastised those that procreate in large numbers without taking good care of them:

"Like I was telling you, I want fewer children because I have seen HIV- positive people that we collect drugs together dying and leaving behind many orphans, un-catered for who become street children. When I see these children I feel disturbed. No food, no clothing; that makes it important for people especially HIV- positive people to plan their families. Islam as a religion did not recommend that you should go on producing children without taking good care of them. In fact you will be held accountable and punished by God if you don't take good care of your children." (Atiku, 33 year old divorced man).

In addition to economic factors, self-preservation, stress and advancing age were considered by some men when deciding on the number of children. Furthermore, the potential fertility desire of new spouses served as disincentives for re-marriage:

"I want to preserve myself and train the existing (four) children to University level. If there are too many children I cannot afford to sponsor and take good care of them. This is why I have not even re-married because the new wife will also want to have her own children. That is more stress; since I am getting older I don't want too much trouble." (Jaimo, 53 year old widower).

In some cases, the influence of economic factors was conditional indicating that with affluence the desired number of children could change:

"It depends on one's income and wealth. I want a family size that I can provide for without running helter-skelter. However, if I become richer I won't mind any number- I will be happy to have as many as God gives me." (Sulai, 31 years old unmarried man).

No change in fertility desire

Other men denied any change in their desired number of children following HIV diagnosis. They were of the view that being HIV-positive doesn't prevent one from procreation. They

believed that if couples adhere strictly to the advice of health care workers during pre-conception, antenatal and breastfeeding vertical transmission could be avoided:

"No, no change (in the number of desired children) *whatsoever. This is because having HIV does not prevent one from bearing children. The only thing is for one to take care and follow the laid down instructions before pregnancy, during pregnancy and during breast feeding." (Mahmuda, 48 year old married man, currently monogamous).*

Others wanted fewer children *ab initio* to effectively cater for their needs. They denied any change related to their HIV status:

"No change at all! I know that every child is born with his or her prescribed wealth. But I consider that if these children are to be well trained especially these days that you will need to be paying school fees - if you have too many you won't give them the best training and education. Since my days in secondary school I realised how many parents struggled with the school fees, hospital bills, feeding etc. These are the reasons why I want to limit the number to five or six maximum. However, if God gives me additional children I won't reject, in fact I will never stop having sexual intercourse because of the fear of having more children. We use only the calendar method. Like I earlier told you we don't use condoms at all." (Ibrahim, 42 year old married man, monogamous, serodiscordant).

Reasons for desiring more children

Some men wanted more children so that some would survive and help them on their farms. They also viewed children as a source of social security during old age:

"The world was not made for one person, for us (those without too much education), *even when one has 20 children, they can all die. So, how can you want to have 4 or 5? What will you do when they all die at a point when you are too old to replace them? Therefore, as a villager who is dependent on farming, if you have many children they will help you on the farm, but if you have only a few children you will suffer on the farm alone. How do you want to cope during old age if there are no children to support you? So, for us once you are married no matter how many children she bears, it is God that will feed them. But, of course people these days are afraid of the responsibilities that come with many children, but not me." (Liman, 49 year old married man, currently monogamous).*

Other men considered childbearing as a consequence of the increased libido experienced following commencement of ARTs. Therefore, they expect to have more children:

"Yes, there has been a change. You know it is sexual desire/libido that drives child bearing. For us Muslims, when desire increases, more children are likely to be produced. And since my libido increased following commencement of ART drugs, with it came the wish for more children. If there is increased libido, more children will be produced, naturally!" (Ado, 36 year old married man, monogamous).

The joy of fatherhood experienced by one of the HIV-positive men motivated him to want to have more:

"Before knowing that I have the virus, I never thought about children. Like I told you, I was living a rough and irresponsible life as an NDLEA officer with lots of cash. I was not thinking of marriage since I could get any woman I wanted. Children were not on my mind as I never thought they are important. I saw them as a burden. But when I was diagnosed HIV-positive and got married, I was actually worried that I may not bear children due to the effects of HIV. To my amazement my wife conceived and delivered children, on three successive occasions-all of them were HIV negative. Together with this came the love of children. When I see them play, it gives me inner joy and hope. I now have a progeny and a reason and responsibility to stay alive and ensure they grow to be responsible citizens unlike my earlier life." (Idi, 46 year old married man, monogamous).

Some of the men wanted more children but were afraid of the deleterious effects of repeated pregnancies on their partner's health. They became more tolerant of family planning for child spacing but not limiting the number of children:

"Well for me there has not been any issue except my concern for the health of my wife who became sick after delivering a set of twins. Based on this difficulty, my wife now wants to practice family planning so that she will rest for like 3 or 4 years to recover her strength before getting pregnant again. But for me there is no problem about getting more children in fact I want to have more. My wife would also need to rest for her CD4 to come up and her womb to rest before we start again." (Danjuma, 35 year old married man, polygamous).

Some men were, however ready to re-consider their stance based on changing circumstances. For instance, a man considered the number of existing children, spiritual influences and his partner's desire as important influences:

"When God gives I won't reject. But you know I already have five living children who are all HIV-negative with my late first wife so I am not under any pressure to have children. However, if my current wife is desirous of a child I will oblige." (HabuFari, 43 year old married man, currently monogamous).

Other men felt the number of children was a spiritual matter as such they have no control over it. They felt helpless about limiting their family size and were also afraid of retribution if they attempt to change God's plans:

….*"I don't bother myself about numbers. As a Muslim whatever the Almighty has destined to create, it will come to pass. It is known that 40 years before anyone is created, his wealth and lifespan are already prescribed. So, I cannot come up with a scheme that would run counter to God's prescriptions." (Mahmuda, 48 year old married man, monogamous, three kids)*

7.6 Factors associated with reproductive intention among HIV-positive men and controls

At bivariate level, reproductive intention among HIV-positive men was significantly associated with ethnicity, marital status, marital duration, education, age and religion. It was also associated with employment status, number of living children, serodiscordance, perception of transmission risk and been informed about safe conception ($P<0.05$) (Tables 7.3 to 7.16). In comparison, among controls it was associated with age, marital status, marital duration, number of living children and employment status ($P<0.05$) (Table 7.3 to 7.16). The factors (age, marital status, marital duration, employment status and number of living children) were common to both groups.

Table 7.3: Association between ethnicity and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Ethnicity	Yes	No	Yes	No
Hausa/Fulani	128 (61.5)	80 (38.5)	148 (69.2)	66 (30.8)
Yoruba	6 (54.5)	5 (45.5)	3 (42.9)	4 (57.1)
Igbo	10 (33.3)	20 (66.7)	18 (64.3)	10 (35.7)
Others	10 (47.6)	11 (52.4)	12 (57.1)	9 (42.9)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
$\chi 2=9.4$, p=0.025*			$\chi 2=3.3$, p=0.35	

Table 7.4: Association between marital status and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Marital status	Yes	No	Yes	No
Single	3 (6.8)	41 (93.2)	-	55 (100.0)
Ever married	151 (66.8)	75 (33.2)	181 (84.2)	34 (15.8)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001*	

Table 7.5: Association between marital duration and reproductive intention

	HIV-positive men (N=223) Frequency n (%) Plans to have a child within 3 years		Control (N=215) Frequency n (%) Plans to have a child within 3 years	
Marital duration (years)	Yes	No	Yes	No
<10	57 (86.4)	9 (13.6)	121 (96.0)	5 (4.0)
≥10	91 (58.0)	66 (42.0)	60 (67.4)	29 (32.6)
Not applicable	6 (12.8)	41 (87.2)	-	55 (100.0)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
$\chi 2=63.9$, p<0.0001*			Fisher's exact, p<0.0001*	

Table 7.6: Association between educational status and reproductive intention

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
	Plans to have a child within 3 years		**Plans to have a child within 3 years**	
Education	Yes	No	Yes	No
No formal	49 (62.0)	30 (38.0)	59 (74.7)	20 (25.3)
Primary	32 (80.0)	8 (20.0)	28 (68.3)	13 (31.7)
Secondary	38 (43.2)	50 (56.8)	51 (58.6)	36 (41.4)
Tertiary	35 (55.6)	28 (44.4)	43 (68.3)	20 (31.7)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
$\chi 2$=16.4, p=0.001*			$\chi 2$=4.95, p=0.18	

Table 7.7: Association between age and reproductive intention

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
	Plans to have a child within 3 years		**Plans to have a child within 3 years**	
Age Group	Yes	No	Yes	No
<30	10 (27.8)	26 (72.2)	2 (5.4)	35 (94.6)
≥30	144 (61.5)	90 (38.5)	179 (76.8)	54 (23.2)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
$\chi 2$=13.2, p=0.0003*			$\chi 2_{trend}$= 70.5, p<0.0001*	

Table 7.8: Association between religion and reproductive intention

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
	Plans to have a child within 3 years		**Plans to have a child within 3 years**	
Religion	Yes	No	Yes	No
Islam	134 (61.8)	83 (38.2)	149 (68.0)	70 (32.0)
Christianity	20 (37.7)	33 (62.3)	32 (62.7)	19 (37.3)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
Fisher's exact, p=0.0019*			Fisher's exact, p=0.58	

Table 7.9: Association between employment status and reproductive intention

	HIV-positive men (N=270) Frequency n (%)		Control (N=270) Frequency n (%)	
	Plans to have a child within 3 years		**Plans to have a child within 3 years**	
Employment	Yes	No	Yes	No
Unemployed	3 (13.6)	19 (86.4)	-	39 (100.0)
Employed	151 (60.9)	97 (39.1)	181 (78.4)	50 (21.6)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001*	

Table 7.10: Association between number of children and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Number of children	Yes	No	Yes	No
0-4	7 (14.6)	41 (85.4)	12 (17.9)	55 (82.1)
≥5	147 (66.2)	75 (33.8)	169 (83.3)	34 (16.7)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
Fisher's exact, p<0.0001*			Fisher's exact, p<0.0001*	

Table 7.11: Association between duration of HIV diagnosis and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Duration of diagnosis	Yes	No	Yes	No
≤1 year	35 (59.3)	24 (40.7)	Not Applicable	
>1 year	119 (56.4)	92 (43.6)		
Total	154 (57.0)	116 (43.0)		
Fisher's exact, p=0.77				

Table 7.12: Association between (spousal) serodiscordance and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Serodiscordance	Yes	No	Yes	No
Yes	76 (63.3)	44 (36.7)	Not Applicable	
No	65 (71.4)	26 (28.6)		
Not applicable	13 (22.0)	46 (78.0)		
Total	154 (57.0)	116 (43.0)		
χ2=39.1, p<0.0001*				

Table 7.13: Association between transmission risk perception and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Perceived chance of transmission without condom	Yes	No	Yes	No
Very high	9 (42.9)	12 (57.1)	39 (67.2)	19 (32.8)
High	103 (56.9)	78 (43.1)	134 (67.0)	66 (33.0)
Average	6 (66.7)	3 (33.3)	7 (63.6)	4 (36.4)
Low	36 (61.0)	23 (39.0)	1 (100.0)	-
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
χ2=2.45, p=0.49			χ2=0.002, p=0.99	

Table 7.14: Association between perceived chance of transmission on ART and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Chance of transmission on ART	Yes	No	Yes	No
Higher	40 (58.8)	28 (41.2)	4 (50.0)	4 (50.0)
Same	60 (55.0)	49 (45.0)	43 (69.4)	19 (30.6)
Lower	54 (58.1)	39 (41.9)	2(100.0)	-
Don't know	-	-	132 (66.7)	66 (33.3)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
χ2=0.31, p=0.86			χ2=1.37, p=0.50	

Table 7.15: Association between perceived chance of transmission on PrEP and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Chance of transmission on PrEP	Yes	No	Yes	No
Higher	38 (57.6)	28 (42.4)	2 (40.0)	3 (60.0)
Same	70 (57.4)	52 (42.6)	44 (69.8)	19 (30.2)
Don't know	46 (56.1)	36 (43.9)	135 (66.8)	67 (33.2)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
χ2=0.043, p=0.98			Fisher's exact, p=0.51	

Table 7.16: Association between receipt of safe conception information and reproductive intention

	HIV-positive men (N=270) Frequency n (%) Plans to have a child within 3 years		Control (N=270) Frequency n (%) Plans to have a child within 3 years	
Provided safe conception information	Yes	No	Yes	No
Yes	8 (88.9)	1 (11.1)	29 (69.0)	13 (31.0)
No	146 (55.9)	115 (44.1)	152 (66.7)	76 (33.3)
Total	154 (57.0)	116 (43.0)	181 (67.0)	89 (33.0)
Fisher's exact, p=0.04*			Fisher's exact, p=0.86	

7.7 Predictors of reproductive intention among HIV-positive men and controls

Using binary logistic regression analysis on the combined dataset for HIV-positive men and controls (N=540) and adjusting for confounders (age, education, religion and ethnicity) showed that HIV status, marital status and duration, employment and number of living

children were significant predictors of reproductive intention (Table 7.17). HIV-positive men were 20% less likely to intent to have a child within three years. Married men were more than five times likely to plan to have a child in the next three years. Similarly, those that were married for shorter duration (<10 years) had a 31% higher chance of planning to have a child within three years compared to those married for longer period. Furthermore, employed men had more than six-fold increased likelihood of planning to have a child within the same period relative to unemployed persons. Men with less than four children had over three-fold likelihood of planning to have a child within three years compared to those with more children.

Table 7.17: Logistic regression model for predictors of **reproductive intention** among **HIV-positive men and controls** in Kano, Nigeria

Characteristics	N=540 intents to have a child* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	*P* value
Age group				
<30	104 (50.5)	Ref		
≥30	231 (69.2)	1.37 (1.18-1.60)	1.19 (0.73-1.38)	0.09
HIV status				
HIV-positive	154 (57.0)	0.72 (0.24-0.98)	0.80 (0.37-0.91)	0.03†
Control	181 (67.0)	Ref		
Marital status				
Single	3 (3.1)	Ref		
Ever married	332 (75.3)	24.8 (8.1-75.8)	5.6 (2.42-12.81)	0.001†
Marital duration (years)				
<10	179 (92.7)	1.51 (1.36-1.68)	1.31 (1.15-1.59)	0.012†
≥10	151 (61.4)	Ref		
Religion				
Islam	283 (64.9)	1.30 (1.06-1.59)	1.13 (0.72-1.39)	0.35
Christianity	52 (50.0)	Ref		
Education				
No formal	108 (68.4)	1.10 (0.92-1.31)	0.97 (0.73-1.14)	0.62
Primary	60 (74.1)	1.2 (0.99-1.44)	0.86 (0.77-1.28)	0.47
Secondary	89 (50.9)	0.82 (0.67-1.07)	0.53 (0.54-1.02)	0.28
Post-secondary	78 (61.9)	Ref		
Ethnicity				
Hausa/Fulani	276 (65.4)	Ref		
Yoruba	9 (50.0)	1.31 (0.82-2.09)	1.15 (0.63-1.57)	0.41
Igbo	28 (48.3)	1.35 (1.03-1.78)	1.21 (0.73-1.62)	0.32
Others	22 (52.4)	1.25 (0.93-1.68)	1.19 (0.48-1.53)	0.26
Employment				
Unemployed	3 (4.9)	Ref		
Employed	332 (69.3)	14.1 (4.67-42.6)	6.24 (2.14-13.5)	0.003†
Number of living children				
≤4	316 (74.4)	4.50 (2.97-6.81)	3.21 (1.42-4.57)	0.012†
≥5	19 (16.5)	Ref		

*reproductive intention: plans to have a child in the next 3 years;
†Significant at *P*<0.05; OR: Odds Ratio, CI: confidence interval; Ref: reference group

7.8 Predictors of reproductive intention among HIV-positive men

Considering HIV-positive men alone (N=270), a binary logistic regression model adjusting for sociodemographic (age, education, ethnicity) and HIV-related (perceived transmission risk, spousal serodiscordance) and health care (receipt of safe conception information) factors showed that reproductive intention was predicted by marital status and duration, religion, employment and number of living children (Table 7.18). Specifically, there was a more than four-fold increased chance of intending to have a child within three years among married HIV-positive men compared to those that were single. In addition, those married for a shorter duration had a 34% increased likelihood of planning to have a child relative to those married for longer period. Furthermore, HIV-positive men of Islamic faith had 37% more chance of planning to have a child compared to those of Christian faith. Also, employed men were more than twice likely to intent to havee a child in three years time. Finally, men with fewer than five children were more than four times likely to intent to have a child in three years relative to those that had more children.

Table 7.18: Logistic regression model for predictors of **reproductive intention (in the next 3 years)** among **HIV-positive men** in Kano, Nigeria

Characteristics	N=270 Intents to have a child* No. (%)	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)**	*P* value
Age group				
<30	45 (50.0)	Ref		
≥30	109 (60.6)	1.21(0.95-1.54)	0.92 (0.82-1.36)	0.54
Marital status				
Single	3 (6.8)	Ref		
Ever married	151 (66.8)	9.80 (3.27-29.33)	4.23 (1.37-16.45)	0.002†
Marital duration (years)				
<10	58 (86.6)	1.49 (1.27-1.76)	1.34 (1.14-1.47)	0.023†
≥10	91 (58.0)	Ref		
Religion				
Islam	134 (61.8)	1.64 (1.14-2.35)	1.37 (1.05-1.28)	0.031†
Christianity	20 (37.7)	Ref		
Education				
No formal	49 (62.0)	1.12 (0.84-1.48)	0.91 (0.71-1.35)	0.33
Primary	32 (80.0)	1.44 (1.10-1.89)	1.27 (0.81-1.36)	0.62
Secondary	38 (43.2)	1.29 (0.93-1.78)	1.15 (0.58-1.47)	0.37
Post-secondary	35 (55.6)	Ref		
Ethnicity				
Hausa/Fulani	128 (61.5)	1.29 (0.81-2.05)	1.04 (0.62-1.82)	0.27
Yoruba	6 (54.5)	1.44 (1.10-1.89)	1.25 (0.75-1.48)	0.38
Igbo	10 (33.3)	0.70 (0.36-1.38)	0.47 (0.26-1.24)	0.46
Others	10 (47.6)	Ref		
Employment				
Unemployed	3 (13.6)	Ref		
Employed	151 (60.9)	4.47 (1.55-12.84)	2.37 (1.36-5.72)	0.024†
Number of living children				
≤4	147 (66.2)	4.54 (2.28-9.06)	2.46 (1.27-5.74)	0.015†
≥5	7 (14.6)	Ref		
Perceived transmission risk without condoms				
High	118 (55.9)	1.09 (0.86-1.38)	0.89 (0.67-1.18)	0.27
Low	36 (61.0)	Ref		
Serodiscordance				
Yes	76 (63.3)	Ref		
No	65 (71.4)	1.13 (0.94-1.37)	0.94 (0.68-1.17)	0.19
Received safe conception information				
Yes	5 (83.3)	1.48 (1.02-2.14)	1.37 (0.74-1.64)	0.57
No	149 (56.4)	Ref		

*reproductive intention: plans to have a child in the next 3 years;
†Significant at *P*<0.05; OR: Odds Ratio, CI: confidence interval; Ref: reference group

A range of reasons informed men's fertility preferences after HIV positive diagnosis. These centred on health, transmission risk and economic considerations. Other reasons were related to the future of orphaned children and stress associated with child rearing. Finally, spirituality had a strong influence in some men's decisions about children and more often than not this meant having an open mind about the number that might come their way. The predictive effects of marital duration, number of living children and risk perception were demonstrated in the survey results.

7.9 Reproductive outcome

7.9.1 Spousal pregnancy, participation in PMTCT and HIV status of existing children

The spouses of more than two-thirds (69.5%) of the HIV-positive men conceived at some point following their diagnosis and over a tenth 13.0% (*n*=29) were pregnant at the time of this study. Nearly all HIV-positive men 266 (98.5%) were aware of the prevention of mother to child transmission of HIV (PMTCT) programme as against less than a third 77 (28.5%) of controls, but less than a quarter (22.9%) of HIV-positive men ever participated in the programme. In addition, over a third (43.5%, *n*=97) of HIV-positive men had at least one sero-positive child (Table 7.19).

Table 7.19 Spousal pregnancy and HIV status of children of HIV-positive men

Attribute	Response categories	Frequency (%) HIV-positive men (Post-diagnosis)
Spouse conception after husband's HIV-positive diagnosis	Yes No Not applicable **Total**	155/223(69.5) 68/223 (30.5) 47 **270(100.0)**
Spouse pregnant at time of study	Yes No Not applicable **Total**	29/223(13.0) 194/223(87.0) 47 **270(100.0)**
Have a HIV-positive child	Yes No Not applicable **Total**	97/223(43.5) 126/223(56.5) 47 **270(100.0)**

Themes from qualitative interviews concurred with the survey results. For instance, a man confirmed that his spouse was pregnant at the time of the interview:

"No children yet, but my wife is currently pregnant." (Abdullahi, 33 year old married man, monogamous).

Others had HIV-negative children. These were couples who reportedly adhered to pre-conception, antenatal and postpartum advice given by their health care providers:

"I have three HIV-negative children and one HIV-positive foster child. My HIV-positive wife had him (the foster child) with her previous husband. At that time she was not diagnosed and hence was not on treatment. Her subsequent children with me are all HIV-negative and I think this is because she has been on treatment and followed the instructions of the doctors." (Ado, 36 year old married man, monogamous).

Others had both HIV-positive and HIV-negative children. Children born before the parents became aware of their HIV-positive status were mostly HIV-positive:

"My son who was delivered before we realized our HIV status is HIV-positive. However, I am lucky that my daughter who was conceived while my wife was on medication is HIV-negative. I think this is due to the antenatal care and hospital delivery she had." (Liman, 49 year old married man, currently monogamous).

For some, however, the children died or were HIV-positive and this was apparently linked to delayed parental HIV diagnosis:

"I had four children, two of them (twins) died quite early even before we (me and my wife) *knew that we were HIV-positive. The other two are alive but HIV-positive." (Danjuma, 35 year old married man, monogamous).*

Another man experienced mysterious repeated infant deaths. They were attributed to some cultural beliefs and paranormal phenomenon. However, it all stopped following parental HIV diagnosis and placement on ARTs:

"My wife delivered four times, but each time the baby died. The first three were male babies and I named them Yusuf (after my late father), but they died shortly after the naming ceremonies. I was advised by my in-laws and neighbours to change the name in case it was some bad luck linked to my insistence on naming them after my late father. They said the children were literally following my late father to his grave since he died long time ago. The repeated deaths were a mystery as no one could clearly determine the cause. So, following the birth of my fourth male baby, this time I named him Usman, my uncle's name (my uncle is still alive). Unfortunately, the baby also died. The fifth one was a girl, who was delivered after my wife was diagnosed HIV-positive and started on (ART) medication. The baby survived and she is now my only surviving child." (HabuFari, 43 year old widower)

This range of experiences indicates that undiagnosed HIV is inimical to child survival. The trend also showed that high infant loss occurred among parents who were unaware of their HIV-status, but following diagnosis and commencement of treatment, most men had HIV-negative children.

7.9.2 Spousal fertility desire and communication

The proportion of HIV-positive men who perceived that their spouses want more children was significantly lower than among controls (62.2% versus 85.6%) (P<0.05). In contrast, a higher proportion of HIV-positive men (79.4%) had discussed their reproductive desires with their spouses compared to 53.0% of the controls (P<0.05) (Table 7.20).

Table 7.20 Perceived spousal fertility desire and communication among HIV-positive men and controls

Attribute	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Perceives that spouse wants more children	Yes	184/215(85.6)	168/223(62.2)
	No	12/215(5.6)	37/223(16.6)
	Don't know	19/215(8.8)	18/223(8.1)
	Not applicable	55	47
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square	P=0.002	
Discussed reproductive desire with spouse(s)	Yes	114/215(53.0)	177/223(79.4)
	No	101/215(47.0)	46/223(20.6)
	Not applicable	55	47
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square	P<0.0001	

Themes from qualitative interviews also indicated that some HIV-positive men discussed their reproductive plans with their spouses and that some were supportive:

"Oh yes, I did (discuss my desire to have more children with my wife)*. She is also supportive of my wish to have more children." (Ado, 36 year old married man, monogamous)*

However, some men did not discuss their fertility desires with their spouses and were of the view that tinkering with such spiritual matters could attract divine punishment:

"No, we have not (discussed about number of children). *The simple reason being that as a Muslim who believes in God, whatever the Almighty has destined to create will come to pass. Whenever it crosses my mind to discuss about reducing the number of children, this teaching of our religion crosses my mind and deters me. It is also clear to me that no one fulfils pledges more than our creator. He owns us all. Especially given that God has given us strength and a level of health that enables us to work even harder than some HIV-negative people, I see no reason why I should contemplate hatching an agenda about children that would be contrary to what God has ordained. The consequences of doing this may backfire on me." (Waiti, 45 years old married man, monogamous, three children).*

7.9.3 Contraceptive use

The reported low use of modern contraceptives by partners of HIV-positive men was confirmed by an official of a support group who volunteers in the men's clinic:

"I am not aware of any HIV-positive man or their wives that use any other family planning method apart from condoms. None of them have ever approached me requesting specifically for family planning method except condoms-which they use to protect their partners rather than for preventing pregnancy." (Ado, 36 year old married man, monogamous).

However, there was evidence from qualitative interviews that some men were gradually changing their minds and becoming more supportive of family planning. This was especially seen among younger men, some of whom were not yet married:

"I support family planning, but it should be based on their choice. There are several safe family planning methods; I think gradually even the Islamic religious scholars who were hitherto strong opponents of family planning have started tolerating it to some extent. Even husbands see that if their wife rests for some time in between pregnancies she remains well preserved, looks healthier and more beautiful. I don't have any problem with family planning." (Atiku, 33 year old divorced man).

He went further to suggest an ideal interval between deliveries to ensure a healthy mother and baby.

"In Hausa culture, I see other (HIV-negative) women deliver annually but some deliver after every two years. I will prefer an increase in interval to 3 years or in fact 4 years for HIV-positive couples to ease their burden. Since doctors tell us that there are ways of having sexual intercourse with wife without her getting pregnant. I won't even mention condom as the first one. Even romantic plays with one's wife can lead to joy and satisfaction without real sex. And then occasionally you can have sex. Doctors also instruct us that if we want to conceive we should come for advice. Although I have not yet gone since I don't have a wife at present I cannot give the details of the advice given. May be I will go in future." (Atiku, 32 year old divorced man)

Another man indicated his partner's readiness to adopt a method other than the condom.

"We have not used any family planning method so far. However, my wife said that after her next delivery we should go and see the gynae doctor for advice on the method that she will be using, may be injection or pills." (Jobdi, 44 year old married man, monogamous).

It is essential that health workers are well informed about effective contraceptive methods for HIV-positive couples. This would ensure appropriate counselling of these couples about contraceptive methods for HIV-positive men and women. This is important because of the effect of some antiretroviral drugs on hormonal contraceptives.

7.9.4 Perception of HIV transmission risks

Over half (58.1%) of HIV-positive men believed that it was possible for a HIV-positive man to impregnate his wife without transmitting the virus. In contrast, less than a third (31.1%) of controls thought so. Similarly, more than three quarters (79.6%) of HIV-positive men entertained the likelihood of a HIV-positive man fathering a HIV-negative child as against less than a third (30.0%) of the controls ($P<0.05$) (Table 7.7).

7.9.5 Awareness of safe conception methods

Apart from artificial insemination of husband's semen in hospital that was mentioned by more than a quarter (26.3%) of HIV-positive men and a fifth (20.7%) of the controls, the level of awareness of safe conception methods was poor in both groups. Technologically less intensive methods such as timed intercourse at peak fertility and manual insemination at home were virtually unknown except by a few HIV-positive men (Table 7.21).

Table 7.21 Transmission risk perception and awareness of safe conception methods among HIV-positive men and controls

Questions	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Possible for HIV-positive man to impregnate spouse without infecting her	Yes	84(31.1)	157(58.1)
	No	135(50.0)	68(25.2)
	Don't know	51(18.9)	45(16.7)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square	*P*<0.0001	
Possible for HIV-positive man to father HIV negative child	Yes	81(30.0)	215(79.6)
	No	101(37.4)	10(3.7)
	Don't know	88(32.6)	45(16.7)
	Total	**270(100.0)**	**270(100.0)**
	Pearson's chi-square	*P*<0.0001	
Aware of these safe conception methods	Manual insemination at home	-	4/270(1.5)
	Artificial insemination in hospital	56/270(20.7)	71/270(26.3)
	Sperm washing	1/270(0.4)	4/270(1.5)
	Timed intercourse at peak fertility	-	2/270(0.75)
	Pre-Exposure ART prophylaxis	1/270(0.4)	-
	ART treatment of infected partner	1/270(0.4)	2/270(0.75)

This was corroborated in qualitative interviews. A man reported not only hearing about but knowing several HIV-positive couples who had HIV-negative children:

"I do not only know, I have seen several examples of that. I know there is a hazard for the baby. However, I cannot say how much hazard there is since I told you that I know of some HIV-positive parents that had HIV-negative children." (Abubakar, 30 year old unmarried man).

This was further buttressed by a man who described his personal experience metaphorically:

"There is a risk but if the parents follow the rule, then the baby will be born and breastfed without HIV as is the case with my last born daughter. If one is lost in a city and starts walking aimlessly without asking for direction you know that he is lost forever. But if he asks those who know he won't get lost. So, it is the same thing here." (Liman, 49 year old man, currently monogamous).

7.9.6 Practice of safe conception

Only two (0.9%) HIV-positive men reported previous participation in safe conception procedure. Specifically, they had artificial insemination of their partners in a private hospital (Table 7.22).

Table 7.22 Participation in PMTCT and practice of safe conception

Questions	Response categories	Frequency (%) Control group	HIV-positive men
Participation in PMTCT	Yes	-	51/223(22.9)
	No	215/215(100.0)	172/223(77.1)
	Not applicable	55	47
	Total	**270(100.0)**	**270(100.0)**
	Fisher's exact test	*P*=0.000	
Practice of safe conception methods	Yes	-	2/223(0.9)
	No	215/215(100.0)	221/223(99.1)
	Not applicable	55	47
	Total	**270(100.0)**	**270(100.0)**

7.10 Chapter Summary

This chapter has explored the fertility preferences of HIV-positive men, a relatively neglected but important area. Most demographic research has tended to focus on the effects of HIV/AIDS on fertility rates in women. The substantial proportion of HIV-positive men with spouses within the reproductive age in this study underscored the importance of exploring their fertility desires and influential factors.

HIV-positive men had a similar number of living children as their contemporaries. However, a substantial but significantly lower proportion of these (HIV-positive) men (79.3% versus 91.1%) wanted to have more children in future. Similarly, a lower proportion of HIV-positive men (57.0% versus 67.0%) planned to have a child in the next 3 years. Specifically, partners of over two-thirds (69.5%) of HIV-positive men conceived at some point after the man's diagnosis and over a tenth 13.0% were pregnant at the time of the study. While nearly a quarter of men felt their fertility desire had been reset downwards in view of the HIV-positive status (20.7%), majority denied any change (63.7%) while the rest reported an increase (15.6%). Furthermore, only (17.0%) of the partners of HIV-positive men and (15.2%) of those of controls used any form of modern contraception with most men considering final decision about number of children as outside their control.

HIV-positive men's fertility intentions in this study were lower than the general population and contraceptive use is relatively higher, although there are still high levels of unmet need for family planning in this population. PLWHA have unique issues to grapple with in their reproductive preferences and choice and have additional considerations to take when deciding whether or not to have children. These include the possibility of infecting the child and sexual partner. Some PLWHA continue to have children for a range of personal, cultural and economic reasons. Others decide to stop childbearing. They face several barriers and their reproductive health needs are not necessarily met by an overstretched health care system.

Fear of infecting the partner and consequently the child was uppermost on the minds of those who wanted fewer children. Other men considered economic factors and orphan hood while some empathized with their spouses on the health effects of repeated childbearing. Furthermore, men wanted to avoid stress and ensure self-preservation. Enhancers of fertility desire were spirituality, lack of control over number of children and fear of retribution.

Predictors of fertility intention among HIV-positive men included marital status, duration of marriage, religion, employment and number of living children.

Although nearly all HIV-positive men were aware of PMTCT, more than a third (43.5%) had at least one HIV-positive child. In addition, poor obstetric outcome was seen among these couples before diagnosis. Furthermore, risk perception was low among HIV-positive men and only a few practised safe conception methods. The response of the health care service to HIV-positive men's reproductive desire is described next.

Chapter 8 Findings: Health Care Service Response

8.1 Introduction

This chapter reports on the perspectives of health care providers on organization and adequacy of sexual and reproductive health (SRH) services for HIV-positive men and their partners. It relies mainly on data from interviews with health care providers in their roles as providers and service managers. It also includes the views of HIV-positive men on availability and access to SRH services. Health care service response to the SRH needs of HIV-positive men and their partners is described in terms of existence of policy guidelines, staffing, health care provider capacity and material resources for SRH services. In addition, it reports on sexual behaviour of HIV-positive men as perceived by health workers. Furthermore, it describes the attitudes of health workers towards pre-marital screening and reproductive rights of HIV-positive couples. It concludes with an assessment of felt stigma experienced by HIV-positive men in health care settings and the challenges they faced when accessing ART and SRH services.

8.2 Capacity to provide SRH services

8.2.1 Staffing

Health care services were provided at the centre by a multi-disciplinary team comprising of health managers, doctors, nurses, pharmacists, health record officers, pharmacists, monitoring and evaluation officers, laboratory scientists/technicians and community health extension workers. Other team members include clinical assistants, social workers, adherence counsellors, community volunteers, messengers and cleaners. In response to the inquiry on team composition, the project director said:

"Categories of staff include, health managers, doctors (Specialist physicians from the infectious disease unit, chest unit, haematology, and resident doctors from microbiology, internal medicine and haematology), nurses (working in different units, counselling, cancer screening, palliative care, adherence and triage units), health information/card issuers, monitoring and evaluation officers, pharmacists, laboratory technicians, community health extension workers etc." (Dr Mustapha, Male, Senior Physician/Project Director).

8.2.2 Organization

The programme managers comprised mainly staff from the Institute of Human Virology, University of Maryland sponsored through US government's President Emergency Plan for HIV/AIDS Relief (PEPFAR). Medical staff and the rest of the team are employees of the Federal Government of Nigeria. They are primarily from a range of clinical departments- Infectious diseases units of Internal medicine, medical microbiology, community medicine and haematology. However, there were medical officers primarily employed by the teaching hospital to provide consultation at the ART clinics. The nursing staff, community health extension workers and other staff except those of pharmacy, laboratory services and records was coordinated by the directorate of nursing services. These staff members from different sources once seconded to the SS Wali ART centre undergo an orientation program together with other new team members and are coordinated by the most senior clinician and the chief matron. Weekly meetings of the teams are held to review clinical activities, discuss challenges and profer solutions. Funding was mainly from PEPFAR and the Federal Government of Nigeria. Support groups received donations from philanthropists and other NGOs to provide social and emotional support for registered members.

8.2.3 Training

Most health care workers indicated that they have received a series of training inputs from international and local non-governmental organizations on various aspects of HIV diagnosis, treatment, care and support. Basic, intermediate and advanced courses were organized for the different cadres of health care professionals. Although some trainings were organized for specific professional groups, but most trainings were for teams on cross cutting issues. The content also varied with the composition of the target group. The longer the health worker has been engaged at the centre, the more likely they would have received further training. The extent of training received by team members was described by a program manager:

"Oh yes! We have had lots of trainings organized by the Institute of Human Virology of the University of Maryland. These include training on treatment and care of PLWHA, palliative care, treatment challenges, side effects and adherence for people living with HIV among others. Other categories of staff receive training relevant to the services they provide." (Kande, Female, Adherence Counsellor/Program Manager).

A lead physician and health manager reiterated this fact. He indicated that they have received extensive training on clinical and programmatic aspects of HIV/AIDS within and outside the country:

"We have received so many training sessions with respect to HIV both during residency training program and after completion of the program. In addition, I specifically attended many short courses within and outside the country. These include those organized by the Nigerian Institute of Medical Research, Jos University Teaching Hospital (JUTH), IHVN (Institute of Human Virology of Nigeria) and at the University of Maryland at Baltimore. In addition, I have also attended courses at Institute of Public Health, Makerere University, Uganda among several others." (Dr. Mustapha, Male, Senior Physician/Project Director).

Some of the training covered aspects of sexual and reproductive health. Specifically, there was training on prevention of mother to child transmission of HIV and methods of assessing sexual and reproductive health needs of PLWHA. This was further described:

"Yes aspects of sexual and reproductive health were covered. One of the courses focused on prevention of mother to child transmission of HIV. Others dealt with organizing and conducting surveys on sexual and reproductive health needs assessment for PLWHA in Nigeria. There was a pre-survey training on tools development, pretesting and the conduct of the survey." (Dr. Mustapha, Male, Senior Physician/Project Director).

Even though most senior managers and health care workers reported that they have received various forms of training, none mentioned training on methods of safe conception. In addition, some younger health workers received little or no further training on HIV/AIDS management since qualifying. In response to a question on whether he has had additional training on HIV/AIDS after leaving medical school, a young doctor said:

"No. I have not received any additional training on HIV/AIDS since graduation. I have been reading on my own and I do ask questions from my seniors on aspects of care that was not clear to me and they are always willing to clarify even over the phone." (Dr. Hadi, Male, Medical Officer).

Due to the rapid evolution in the management of HIV/AIDS, health care workers were unanimously of the view that continuing professional development courses on HIV care, treatment, and support should be organized periodically to keep them updated on these changes. A medical doctor stated:

"HIV/AIDS is a rapidly evolving field; the things we were taught in medical school soon become obsolete. Therefore, there is need for the continuous update of one's knowledge and skills especially, regarding recent advances in treatment including sexual and reproductive management." (Dr. Hadi, Male, Medical Officer).

8.2.4 Roles and responsibilities

Some of the health care workers indicated that they started from clinical roles but took on additional administrative roles or moved to managerial cadres altogether after a while:

"I work at this centre as a program officer, care and support, before then, I was program officer adherence. Much earlier, I had worked as an adherence counsellor. Although I still have direct clinical responsibility for HIV positive patients both men and women, but this role is now minimal with most of my time spent on management duties." (Kande, Female, Adherence officer/Program manager).

Other health managers still had substantial clinical responsibility. This dual role was common and the time devoted to clinical and administrative duties varied as explained by the matron-in-charge:

"I am the matron in charge of S.S Wali Centre, Aminu Kano Teaching Hospital. I am the most senior nurse manager and clinically we also recruit and provide both preventive and curative care to HIV-positive men and women. Apart from providing ART drugs, we manage tuberculosis, hepatitis B and other STIs in HIV-positive patients (both men and women)."(Zainab, Female, Senior Nurse/Matron in-Charge)

Although dual roles came with additional allowances, respect and power, the downside was the competing demand on their professional time. In the process, one of the roles suffered and this manifested as shortened consultation time, patient dissatisfaction or late commencement of management meetings. These indirectly affected service quality and responsiveness.

8.2.5 Policy and guidelines

Different categories of health care professionals confirmed the existence of a policy document on 1) HIV/AIDS treatment, care and support and 2) laboratory and other clinical standard operating procedures (SOPs). These documents were reportedly adapted from the World Health Organization and national guidelines. The project director responded as follows when asked about HIV/AIDS related policy documents:

"Yes we do have a policy. We follow the national policy. We use the national HIV ARV treatment, care and support guideline version 2014 and the laboratory and other SOPs for the different units. They have been adapted from WHO documents and further adapted to the local peculiarities in this hospital." (Dr. Mustapha, Male, Senior Physician/Project Director).

There were disagreements between the accounts provided by health managers and health care workers regarding the existence of a policy on provision of SRH services as part of ART services. Health managers reported the existence of such a policy, but were unsure of its implementation as stated here by a program manager:

"Yes, there is a policy on integration of sexual and reproductive health into the ART programme. It was reviewed but I don't know if it is in the clinic right now. We have the e-copy and we have discussed with relevant groups but it takes time before these policies are implemented in the clinic. Every concerned officer knows that such a policy exist just like the policy on stigma and discrimination which was only recently released to the clinics." (Kande, Female, Adherence counsellor/Program manager).

However, clinical staff could neither confirm the existence of such a policy nor its implementation. They explained that HIV-positive men presenting with other STIs were managed based on the capacity of the consulting doctor. Cases beyond their scope were referred to a specialist STI clinic within the hospital. The matron in charge retorted:

"No, I am not aware of any such guideline (on ART, SRH service integration). *However, when HIV positive men or women present with other STIs, the doctors and other health workers manage them to the best of their ability. If it is outside the scope of their expertise they refer them to their seniors within the clinic here or specialized STI clinic elsewhere within the hospital." (Zainab, Female, Senior Nurse/Matron in-Charge).*

A counsellor was also unaware of a policy on provision of SRH as a component of the ART programme but confirmed the existence of separate policy documents and guidelines on PMTCT and family planning. The later was not specific for HIV/AIDS patients. In response to the inquiry about policy on provision of SRH and ART services in an integrated manner, she said:

"Not specifically on integration, but I am aware of the policy on PMTCT, Family Planning, and Counselling. For the PMTCT program, most of our clients are referred from the antenatal clinic after testing positive. About sexual issues we counsel our patients, especially serodiscordant couples, we discuss with them. You can't dictate their personal lives but you can counsel them on how to go about it (sexual intercourse). *Though they have serodiscordant partners, you cannot tell them to go and divorce their spouses. You counsel them on safe sex." (Bintu, Female, Chief Counsellor).*

Despite the conflicting accounts about provision of SRH services as a component of ART, one of the health managers indicated their readiness and patients' preference for receiving both services at the centre. However, she identified shortage of skilled manpower as a major impediment. She identified training and modification of treatment protocols as pre-requisites.

"Yes, we have plans but currently we have insufficient skilled manpower. If additional manpower are provided and trained in managing STIs including the complicated ones, it will be a welcome idea as most of our clients prefer to be treated for all problems here at SS Wali centre in order to protect their confidentiality. Sometime when we refer them to other clinics, one of our referral officers have to physically follow them otherwise they refuse to go and you know the consequences of untreated ulcerative STI on the spread of HIV. If in future we are given the opportunity to integrate STI and ART services we and the patients will like it." (Zainab, Female, Senior Nurse/matron in-charge).

The project director and senior clinician was aware of the efforts at the national level for integrating SRH and HIV treatment, care and support, but declared that this has not reached the implementation stage:

"Not really, I am not aware of such a policy. I know there are efforts at the national level to integrate SRH into comprehensive HIV care, but to the best of my knowledge, this has not been operationalised." (Dr. Mustapha, Male, Senior Physician/Project Director).

8.3 Sexual and reproductive counselling and treatment for HIV-positive men

8.3.1 Counselling HIV-positive men

In this section, health care workers reported on the extent and scope of counselling provided to HIV-positive men and their partners:

"We provide an overview of HIV infection, transmission and prevention. Also we discuss its relationship with tuberculosis, other STIs and opportunistic infections. The various entry points to treatment programs as well as care. In addition, we counsel them on linkages with other treatment programs as well as adherence counselling for TB and HIV treatment regimens." (Kande, Female, Adherence counsellor/Program manager).

They re-assured patients and emphasised the benefits of adherence and cooperation with hospital staff in all aspects of care, treatment and support. They also discussed their challenges and proffer solutions:

"We start by assuring the patient that he is in good hands and that his life is very important to us. Secondly we let him know of the benefits of positive living and cooperating with us by taking his drugs as prescribed and feeding well. We try to identify challenges he currently faces or those he anticipates based on his current status and discuss how he could overcome them."(Kande, Female, Adherence counsellor/Program manager).

Several health workers mentioned the concept of 'positive living'. This, they explained, comprised of positive attitude towards life, recognising the important roles that others play in one's life and taking responsibility for protecting them:

"Positive living is having positive attitude towards life generally. It starts with knowing one's self. Appreciating who you are and other people around you and accepting that they play a role in your life and that they can complement your health. You have to accept that it is your responsibility to protect these people and others in the community from getting infected by you or any other person through primary and secondary prevention."(Kande, Female, Adherence counsellor/program manager).

For married men, health workers encouraged them to disclose to their spouses. Once permission is granted, these men are requested to bring their partners during subsequent clinic visits.

"Once we have a new client, we tell them to come along with their partner during the next visit. Most of them bring their partners but some do not. Whether or not they do, we advise them on the need to disclose to their partners and use condoms consistently. We educate them on prevention. We tell them about the highly infectious nature of HIV, especially during sexual intercourse. We advise abstinence, faithfulness and condom use. We also provide free condoms always." (Bintu, Female, Chief Counsellor).

HIV-positive couple in most settings refers to a man and his spouse. In this study site, however, it could be a man and two, three or even four spouses. This poses additional challenges. Health workers explained how they deal with men in such polygynous marriages:

"You also know that most men in northern Nigeria are polygamous, so if the wives (2, 3 or 4) are in harmony, the husband brings them all at once. But if they are not (some may not be in talking terms), or living far apart, we tell the man to bring them separately, one at a time. Almost all the men agree to these arrangements. Of course men that are not married are requested to bring their sexual partners. This is more difficult as they will tell you that they refused to follow them or that they don't want to disclose their status to them and face desertion" (Bintu, Female, Chief Counsellor).

8.3.2 Sexual and reproductive counselling of HIV-positive men

Health workers highlighted the importance of counselling HIV-positive men on sexual and reproductive matters as it serves as the main route of HIV transmission and the culture in the study area places immense value on childbearing:

"That is very important in the management of HIV because we know HIV spreads predominantly through sexual means. So, it is very important that you make them realise this by counselling them on consistent condom use. But most times the men decline to use condoms. They prefer having sexual intercourse the natural way without condoms. But with every encounter in the clinic we keep on reminding them of the importance of consistent condom use. We have a condom dispenser in the clinic and they can take as many as they want without asking anybody. It is entirely free of charge. Sometimes if a counsellor is present they feel shy, hence the use of anonymous condom dispensers. It is interesting to note that every morning the condom dispenser is filled to the brim and before the end of the clinic it is almost empty. However, they deny that they need condoms. They will tell you that they are not sexually active but the condoms have a way of disappearing." (Kande, Female, Adherence counsellor/program manager).

Health workers reported that though pre-marital sex was culturally objectionable in the study area, it still occurs. In view of this, they counselled both married and single men on consistent condom use:

"We try as much as possible to promote the use of condom if they engage in sex whether within or outside of marriage. When you say the unmarried ones should only abstain without the option of using condom, sex is a natural thing and most of them have been sexually active before HIV diagnosis and even probably got the infection through that route. We do not want to pretend that pre-marital sex is not happening that is why we provide condoms as an alternative for those who cannot abstain. We talk to them about sexual activities and we assure them that sexual activity is natural and not wrong but that they should practice safe sex because of their HIV-positive status." (Kande, Female, Adherence counsellor/Program manager).

In addition they also counselled men, especially the younger ones against intravenous drug use, which is not common but is increasingly being seen in this group:

"Yes, the men that are not yet married, usually apart from counselling them on reducing sexual risk behaviours detected during the pre-test counselling, some are intravenous drug users. We talk to them on these risky behaviours and assist them in discontinuing intravenous drug use and other such risky behaviours" (Bintu, Female, Chief Counsellor).

8.3.3 Health care workers' perception on sexual behaviour of HIV-positive men

Health care workers perceived an initial decrease in libido among HIV-positive men with some men reportedly abstaining soon after diagnosis. However, there is a reported change for some men as soon as the effects of ARTs take hold. Their sexual interest becomes heightened, making appropriate counselling on safe sex paramount:

"They first of all tell you that they are sexually abstinent, especially in the first six months following diagnosis. They say they don't think they can perform, but when the ARTs are started and they start feeling better, they become more sexually active because they have deprived themselves of their desires during the immediate post-diagnosis period and now they come out full blown with a sort of rebound and they become more active than they have ever been. And if you don't counsel them appropriately, they go wild and don't practice safe sex." (Kande, Female, Adherence counsellor/Program manager).

Health care workers also perceived that these men employed other risk reduction strategies including reduction in the number of sexual partners and careful partner selection:

"They change their behaviour, majority of them when they realise that they are HIV-positive, they know that every sexual encounter they have, especially if they don't use condom, they are risking their partner's life. They also know the religious consequences of infecting others, so they tend to change from the promiscuous behaviour that some have engaged in before getting HIV. They become more careful and choosy regarding sexual partners. If they are single they get married to HIV-positive women in order to avoid sexual intercourse with someone who is HIV-negative. Most of them also reduce the number of people they have sex with." (Kande, Female, Adherence counsellor/program manager).

Other health care workers felt that some married HIV-positive men reduced their coital frequency and started using condoms:

"Psychologically when they realise that they are HIV-positive, they tend to reduce the number of contacts even with their spouses. They also start using condoms." (Kande, Female, Adherence counsellor/Program manager).

8.3.4 Health workers' perspectives on risky sexual behaviour among HIV-positive men

Health care workers were of the opinion that the sexual behaviour of HIV-positive men was closely related to their pre-diagnosis behaviour. They felt that those that engaged in risky sexual behaviour prior to diagnosis were more likely to continue along this path after diagnosis. They described how some of these men deceived women:

"Behaviour modification is difficult among men. A man that sleeps around, you cannot easily get them to keep to one woman. It is difficult to make them change and even when they come into the clinic, they try to establish sexual relationships with female clients. Some of them end up deceiving or even sexually abusing these women. These types of men do not use the formal match-making scheme that we have in this centre. They directly get the phone numbers from some desperate women. So, we only come to know after the damage has been done." (Kande, Female, Adherence counsellor/Program manager).

To counter this, health workers reported that they pro-actively counsel women to avoid these types of relationships and be on the watch out. In addition, they forestall this by linking women who are interested in marriage with the officials handling the match making scheme:

"The abuse and deceit doesn't occur in the clinic per se. The men only collect the women's contact phones in the name of being interested in marriage. They now arrange to meet elsewhere and we are aware that occasionally this abuse does occur. We now counsel them against these activities and it has substantially reduced now." (Bintu, Female, Chief Counsellor)

8.3.5 Health care workers' views on men's attitude to condom use

Despite the reported adoption of condoms by some HIV-positive men, health workers lamented their frustrations in convincing men to use condoms. They felt a substantial proportion of men engaged in condomless sex for a variety of reasons. These include interference with sexual sensation and prevention of conception. This in their opinion was common among married men:

"They complain that they don't enjoy sex with condom as it reduces sexual sensation. They prefer direct skin to skin contact. That is the main reason. Another one is that some of them, the married ones that is, who desire to have children know that by using condoms they won't have children. That is why they don't like it" (Bintu, Female, Chief Counsellor).

In addition to the reasons mentioned earlier, health workers thought that psychological factors could have a role in men's dislike for condoms:

"I think it is mainly psychological. They say that with the condom they don't feel the sensation and do not get 100% sexual satisfaction. That is their reason most of the time. Also, they complain that condom will prevent them from having children." (Zainab, Female, Senior Nurse/Matron in-charge).

Furthermore, they felt that some men either lacked the will power, control or skills to use condoms. In addition, condoms were seen to limit sexual satisfaction:

"The men do not like condoms. Some of them don't know how to use it. The women use to tell us that their husbands ejaculate prematurely while struggling to put on the condom. Others also complained of lack of sensation and poor sexual satisfaction as they don't feel they are having sex when they are using condom, they feel it is like licking sweets inside the wrap which they consider a barrier to sexual satisfaction." (Bintu, Female, Chief Counsellor).

Health workers also suspect that the proportion of men actually using condoms consistently may be even lower than reported by patients, given that spouses of some of these men became pregnant. This, they said, could be due to poor technique or outright non-use:

"We do offer free condoms, but whether they use it is another matter. However, some of their wives become pregnant indicating non-usage, irregular usage or poor technique. During consultations with some of them, they claim they use condoms regularly. Although I have not done any formal study on this. With the high sero-discordance rate, it is quite worrisome that some of these men do not use condoms consistently." (Dr. Hadi, Male, Medical Officer).

Opinions among health care workers were divided about the attitude of spouses of HIV-positive men towards condoms. Some health workers felt that women were also averse to condoms:

"They (women) *also don't like the condom for the same reason especially the second reason about having children." (Dr. Hadi, Male, Medical Officer).*

Others were of the view that condom rejection was mainly a male phenomenon. For instance, a matron highlighted men's negative attitude towards condoms:

"The men are really the problem. Females accept both male condoms and female condoms. We don't have problem with the women. It is good that this study for once is focused on the men and their sexuality. I occasionally have had to meet with officials of the men's support group because the women I work with in the mother to mother support group complained about men's rejection of condom use when the wives take it to them from the clinic. So, the officials of the men's support group educated them at length on the dangers they pose to themselves, their wives and members of society if they don't accept to use condoms consistently. The situation improved after this." (Bintu, Female, Chief Counsellor).

To demonstrate the positive attitude of women towards condoms, health care workers reported that they collected condoms for their men:

"No, we don't have any problem with the women, most at times they are the ones that collect the condoms and take it to their husbands to use. We have a condom dispenser. So, they take any number of condoms they like but the men refuse I don't know why? (Laughter). Most at times the females will come and ask "Matron please give me condoms". I just tell them to go and help themselves at the condom dispenser which we ensure is refilled every clinic day" (Zainab, Female, Senior Nurse/matron in-charge).

8.3.6 Counselling serodiscordant couples

Serodiscordance poses additional challenge to health care workers as a result of the increased transmission risk and men's attitude towards condoms. They described how they handled such couples:

"It starts from the pre-test to the post-test counselling. When a couple comes to do the HIV test, directly from home, or on referral from another clinic e.g. Antenatal, you do a couple counselling followed by an individual counselling. After the test, you do an individual post-test counselling and request for each individual's consent for couple counselling. If that is granted by both, then you do a post test couple counselling. If the positive partner consents to disclosing to the negative partner, then you go ahead and do that, otherwise you don't. If they agree, it is easier as you can talk to both of them about the risk of transmission and the importance of consistent condom use and PMTCT if they want to bear children." (Bintu, Female, Chief Counsellor).

Most women did not hesitate to inform their male partners about their positive HIV-test result. However, some men objected to spousal disclosure. This was uncommon:

"This is rare indeed. But if it happens, we arrange another session with the positive partner where we provide information on the advantages and disadvantages of disclosure. This is supposed to have started during pre-test counselling. Most of them come to agree with the disclosure leading to better understanding and support. However, sometimes on disclosure the uninfected partner refuses to continue with the marital union on suspicion that the partner got HIV from infidelity. Nonetheless, most men consider their wives as the most important person in their lives that they can disclose to. Rarely do married couples identify a third party as being more important." (Bintu, Female, Chief Counsellor).

Men with sero-discordant spouses were further counselled on strict adherence to ART and consistent condom use:

"We also encourage them (men with serodiscordant partners) to use protection. We encourage them to adhere strictly to their ARTs to avoid disease progression and transmission of the virus. This advice is when the two of them are positive. If only one of them is positive, then we emphasize adherence to treatment by the HIV-positive partner and consistent condom use- either the male condoms or the female condom. During each clinic visit the care and support officer demonstrates how to use condoms on models and provide condom supplies. But as you know they are human beings some of them fail to use them consistently. From my own perception I think about 40% of HIV-positive men accept condoms in the clinic but I suppose that may be 10% of them actually use it consistently." (Zainab, Female, Senior Nurse/Matron in-charge).

As earlier alluded to, the culture and religion in the study area not only permits but encourages polygyny as a panacea to pre-marital and extra-marital sexual activity. Some men with several wives (two, three or four) hide their HIV status and take treatment alone until they are threatened by the health workers. Even for those willing to disclose to the spouses, polygamy adds to the complexity of the counselling process. If the HIV-positive man has at least one sero-negative spouse, cooperation of other partners becomes essential for the protection of the HIV-negative spouse. However, this desired cooperation could be denied or jeopardized as a result of jealousy:

See – in my years of counselling experience, we have a lot of (sorry to say) selfish men, they really surprise me. The man tests positive and has four wives but does not disclose to any of them. He takes his ART medication alone leaving these women in the dark! So, as part of our counselling, we ask them about their family, their wives, how many wives do they have? Are they aware of what is happening to you? Mostly if they say their wives are not aware of their situation, we threaten to seize their drugs. We ask them to bring their wives before we give them their drugs. Most of them are scared of this threat because they know the importance of the drugs to their lives; they will immediately bring those poor wives. But the husbands will beg you not to tell their wives that they (the husbands) have HIV and have been taking drugs behind their back. They would say 'Just let them undergo the test without informing them that I am sick. Just tell them is good for everybody to just have the test'. It is not easy. We face these almost on a daily basis. So, we counsel them separately, when the positive partner agrees to disclose, we then bring them together for group counselling. (Bintu, Female, Chief Counsellor).

Like in the treatment process, counsellor's skills determined the extent of sexual and reproductive counselling. The highly skilled were more likely to initiate discussions on such matters:

*Well, (*sexual and reproductive counselling*) is not offered routinely, it depends on the knowledge and skills of the counsellor. Those that are well informed about STIs and HIV provide in-depth information while others refer (Dr. Mustapha, Male, Senior Physician/Project Director).*

The less skilled health workers only address queries or refer HIV-positive men to more experienced colleagues:

"Yes, by and large it depends on the capacity of the health worker. You know a range of workers including doctors, nurses and other professional counsellors provide counselling, so it depends on the skills and knowledge of the health worker." (Bintu, Female, Chief Counsellor).

8.4 Relationships and Marriage-Health care workers' perspectives

8.4.1 Health care workers' opinions on pre-marital screening

The position of health care workers on mandatory premarital screening was varied. Some were of the view that it should be encouraged but left voluntary:

*"There shouldn't be compulsion in anything. But in as much as there is no compulsion, I belief (*pre-marital HIV testing*) is desirable in order to reduce the spread of HIV. I don't agree with compulsion, but it is my desire that everyone knows his partners HIV status before marriage and lives a good life. Nobody deserves to be infected with HIV." (Kande, Female, Adherence counsellor/program manager).*

In contrast, others were of the view that in addition to making HIV testing compulsory, prospective couples should be tested for hepatitis B and sickle cell genotype. Furthermore, they blamed the spread of HIV on low uptake of premarital HIV testing among the predominant Muslim population at the study site. They wondered why Islamic scholars do not insist on these tests like their Christian counterparts:

"Actually my view is that mandatory tests should be done not only for HIV but also for Hepatitis B and Sickle Cell disease before marriage. It is good. If you look at people of the other religion (referring to Christians) without HIV screening certificate, the pastors will not solemnise such weddings, so why is this not happening among Muslims? That is why if you look at our statistics the spread of HIV is higher in our Muslim society. Our people do not go for this HIV testing. Let me give you an example regarding my stance. In fact it is even my daughter; they are now planning to get married. All the necessary arrangements have been made, but I told my daughter that I have one important request before the wedding. I want her and her proposed bridegroom to go for HIV test. My daughter exclaimed WHAT!!! Mummy you mean you don't trust me? I said no. It is not that I don't trust you; it is for your safety and for your husband's safety too that I am insisting on this. I want all of you to be

sure of your status before the marriage. Apart from HIV test, I want you to go for sickle cell test and hepatitis B test. She said, but mummy why? I told her I know you are HbAA, but if we only ask your husband to do these tests alone, he will feel we are suspecting him. We don't know your proposed husband's HIV status, Hemoglobin genotype and hepatitis B status– and these things cannot be seen on the face. I know that my daughter had done HIV test as part of medical examination when she was admitted to the University but, who knows? She was still shocked at my 'unusual' request. She blamed the type of work I do for my stand on this."(Bintu, Female, Chief Counsellor).

8.4.2 Health worker perspectives on the marital match making scheme

Health workers encouraged sero-concordant marriages through an organized match-making scheme managed by the HIV support group earlier described in chapter 5. Interested men (and women) declared their intentions to the officials of the support group and got registered. They provided preferences and motivations for marriage:

"At the SS Wali Centre, we have the support group. Anybody that wants to get married comes to us to provide their background information including their reason for wanting to get married, their occupation, economic situation and the drugs they are taking for HIV. For example if they are on second line or salvage drugs we want to know. We want to know their educational background and current family status. Other information include whether they currently have another wife, children, and their HIV status. Because you cannot do match-making for a serious life long relationship without knowing the prospective partner's life situation. Also for the lady, we want to know her family background, education, previous marriages, whether she is a widow, divorcee or spinster?"(Kande, Female, Adherence counsellor/Program manager).

Using this elaborate checklist, the compatibility of potential suitors is ensured:

"We use it to match the partners. Some of the HIV-positive men specifically request for a widow, divorcee, a spinster, a university graduate, secondary school leaver etc. I also forgot to tell you an important piece of information that we ask both men and women – we ask the number of existing children from previous marriages. Since suitors do ask specifically for women who have not had a child, those with one child, two children and so on. Some request for a young girl who has never married. The women give their specifications too. For instance some desire a man that has never married, some do not mind a man who has married before but is currently divorced – but they would want to know the reason for the divorce and whether or not the man has children" (Zainab, Female, Senior Nurse/Matron in-Charge).

A date is then arranged. The man is instructed to make the first move in line with local custom. In the study area, it is taboo for a woman to declare her interest first in matters of love. Feedback is received from both parties after the first meeting. Once the 'chemistry' is right and the partners confirm compatibility, arrangements are made with their parents/guardians to formalise the marriage without delay:

"We then keep the man's information on our register. If a woman approaches us about marriage, we ask her about her condition, preferences and what she wants from a man? If the specifications tally with any of the men on our register – we tell her about the best match on our "database". If she agrees to a first date, we exchange their numbers insisting that the man will phone her first. We make it a point that we only give out her number if she consents. You know most especially in Northern Nigeria, women do not want to contact the man first. You know it is a taboo here for a woman to approach a man for love – no matter how desperate or love struck she is. Men see it as a mark of cheapness and desperation. So, we tell the man to call her first. We give the man her details also. We tell the man about the woman, where she lives, whether she is a divorcee, a widow or has never married etc. We now ask him to provide feedback after the first "date". We also tell the lady to expect the man's call and also provide us with feedback after the first meeting." (Zainab, Female, Senior Nurse/ Matron in-Charge).

The implementers of the marriage scheme include officials of the support groups, health care workers, peer educators, volunteer workers and adherence counsellors:

"The marriage scheme is managed by peer educators employed at the centre to assist the support group. They are also PLWHA. In addition, there are volunteers that offer home-based care and community adherence counselling. Occasionally other categories of health workers aid or facilitate match-making. But largely it is the peer educators, HIV support group officials and centre staff that are responsible for the marriage scheme." (Zainab, Female, Senior Nurse/Matron in-Charge).

Health workers indicated the enormous success achieved through this scheme. One of the officials reported being involved in arranging more than thirty successful marriages:

"We have been very very successful in the marriage scheme. I know of more than 30 couples that met and married through our match-making scheme – many of them with children living in different parts of Nigeria now." (Bintu, Female, Chief Counsellor).

An official in charge of the marriage register also recounted over 500 marriages from her records over a fifteen year period:

"On our register, records show that since inception of the scheme at this centre in 2000, over 500 couples have been married through this scheme." (Zainab, Female, Senior Nurse/matron in-Charge).

In addition to this scheme, support group officials encouraged their members to alert them on plans by HIV-positive men who are arranging to marry unsuspecting HIV-negative or untested women. When such information is received, the prospective brides and their parents are contacted and advised to insist on pre-marital HIV testing. Such men tend to abscond following this request as they are aware of their HIV status. This is how they further prevent sero-discordant marriages.

"Those that plan to marry HIV-negative women do not consult us. But, somehow we come to know of their plans. You know we have community workers and a network of members and in Islam, marriage can only take place with publicity and witnesses – two people cannot arrange marriage between themselves. So, the news leaks somehow that one of our members is planning a wedding with a non- member (i.e. HIV- negative) woman. The chairman of the support group is usually the person that informs us. If that happens, we call the HIV-positive man and tell him to inform the HIV-negative lady of his HIV status. We also advise the lady and her parents to insist on a pre-marital HIV test. If she still loves him after the disclosure then no one can stop him from marrying her. In most cases we succeed in dissuading them but some still go ahead and marry these unsuspecting women behind our back." (Bintu, Female, Chief Counsellor).

8.5 Reproductive health counselling and services

8.5.1 Health care workers' attitude towards child bearing among HIV-positive couples

While some health workers support the reproductive rights of PLWHA. However, they emphasized the importance of risk communication:

"Absolutely they have the right to bear children. But they need to be furnished with adequate information in order to exercise their rights safely. So that their spouses are not infected and the children are HIV-free. They should be offered a well structured counselling process so that their decision will be well informed and services should be provided for them to attain their set goals in a safe manner." (Dr. Mustapha, Male, Senior Physician/Project Director).

Although others also recognized the rights of PLWHA to bear children, they were of the view that they should have fewer children in view of the risk involved:

"With recent success seen with PMTCT, couples that are HIV-positive and adhere strictly to their medications do have HIV-negative children, so they should be allowed to reproduce so that these children can take care of them as they grow old. However, I think HIV-positive couples should have less number of children compared to uninfected people in the society. This is because we have problems of adherence with some HIV-positive men and their partners. When they fail to adhere to their drugs, especially for the woman, she can give birth to a HIV-positive baby which is very unfortunate adding to the number of infected people." (Dr. Hadi, Male, Medical Officer).

Other health care workers were more stringent in their recommendations. They felt that only childless HIV-positive couples deserve the chance to have one or two children. Understanding these views is important as it could influence the way HIV-positive men are counselled about fatherhood:

"If they don't have a child already, they should be given a chance to have one or two children. But if they have children before the diagnosis – I don't know, you just have to stop. But we cannot tell them to stop. It is not within our power. We don't make decisions for them. They decide. We can only provide information and guide them to decide for themselves. We tell them the danger." (Bintu, Female, Chief Counsellor)

Compared to the information on women's sexual and reproductive health, health workers decried the scant attention given to similar matters regarding men in the HIV counselling module:

"If well counselled, both men and women can make their informed decisions. In order to address this issue it is important to review the HIV counselling module which lacks details about sexual and reproductive issues pertaining to men in particular. They should decide on their own after being provided with information." (Dr. Mustapha, Male, Senior Physician/Project Director).

8.5.2 Health workers' perception of reproductive desire of HIV-positive men

Health care workers perceived that HIV-positive men wanted fewer children compared to their uninfected contemporaries. However, they were of the view that competition between co-wives altered this situation in polygynous settings:

"I would say the men are not keen on having more children, but because they keep on marrying many wives who always want to have their own children out of competition, it becomes a problem. Our Hausa men, they know that they are HIV-positive and they will go and marry and marry and marry again, when he loses a wife, he already had four wives; he would still go and marry a young girl to replace the one that died. The new wife will naturally want to give birth. Having too many children is not the issue, knowing how to train them, making them free from HIV is the most important thing." (Bintu, Female, Chief Counsellor).

Reasons proffered by health workers for reduced fertility desire among HIV-positive men include contentment with existing children and reality of being HIV-positive. In contrast, these workers felt HIV-positive women wanted more children compared to HIV-positive men:

*"The number they (*HIV-positive men*) desire is different because they feel they should plan ahead for those that they already have. Most HIV-positive men are contented with the existing number of children before diagnosis. If they didn't have, they will now want to have 2 or 3. Meanwhile, women want to have as many as they can have. The men come to terms with reality that they are now infected and need to plan. Meanwhile the women are oblivious of this fact. It is only when they have health issues and come down with illness that they regret what they have put themselves into." (Bintu, Female, Chief Counsellor).*

8.5.3 Counselling HIV-positive men about parenthood

Most health care workers considered their knowledge and skills about safe conception as inadequate, especially, with regards to assisted reproductive techniques. Despite this, HIV-positive couples were unwilling to be referred to other specialist clinics;

"We do couple counselling. Then we refer them to the gynaecological clinic. But most times they don't go; they come back with the woman pregnant in the natural way without the necessary pre-conception precautions." (Zainab, Female, Senior Nurse/Matron in-Charge).

Considering the risk involved, it is surprising that PLWHA were unwilling to be referred to clinics outside the ART centre for safe conception. Specialist doctors in obstetric and gynaecologic clinics are more skilful in safe conception procedures. Some couples took repeated risks and were further encouraged by the chance occurrence of HIV-negative babies. If this information circulates among HIV-positive men and their spouses, more of them may be willing to take this path thereby jeopardizing their partners and babies in the process:

"Yes, this happened a number of times. They can be infected (if one of them is sero-negative) and also the baby can become HIV-positive. We have seen HIV-negative women whose husbands are HIV-positive. They come to the clinic already pregnant. I know of three women that surprised me. One of them has a Masters degree in Microbiology; she had a baby with an infected husband even though we counselled her – she is still HIV negative luckily. We have another woman who has put to bed three of her kids with an infected husband but she is still HIV-negative. The third one has two children with an infected husband – she is also still HIV-negative. The babies have turned out to be negative too. These are the surprises you get working with these people. It strengthens your faith in God." (Kande, Female, Adherence counsellor/Program manager).

Health care workers stated that they kept this secret and were constrained by the limited safe conception services they could offer at the centre:

"This is our little secret – we have not disclosed this to other patients. We are aware of the huge risk involved, but what can we do, we don't have assisted safe conception skills here in the SS Wali centre and these patients are hesitant to go on referral outside the centre." (Kande, Female, Adherence Counsellor/Program manager).

8.5.4 Reproductive health services for HIV-positive men

A few health care workers at the centre had both counselling and technical skills to provide safe conceptions. They mentioned three options currently provided at the centre. The first is artificial insemination of husband's semen either at home or in hospital. One of them described this method:

"We explain to them to use condom and if they want to conceive, we teach them on how to go about it by explaining to the couples that when the husband is about to ejaculate, he should withdraw and ejaculate into a clean container, and then they can use a syringe and the woman while still lying down will have the sperm pushed or inserted into her upper vagina. She is advised to remain lying down for some time to allow the sperm move into her uterus for fertilization to occur. There are two types – one is self-artificial insemination at home (where the couples do it themselves) as explained and assisted artificial insemination in hospital. The latter is done by our assistance in the hospital." (Dr. Hadi, Medical Officer, Male).

The second method used among HIV-positive couples at this centre is unprotected sexual intercourse at peak fertility. This option is offered to both serodiscordant and sero-concordant couples after pre-conception investigations.

"We advise them to come with their wife/wives (one at a time). We carry out investigations including their clinical status, CD4 count and viral load. If CD4 is high (indicating good health) and viral load is low or undetectable, we teach them about ovulation cycle and ensure that they understand it very well. The main purpose is to identify the most fertile period of the wife's cycle. Once that is done, we tell them to have sexual intercourse without using condoms during the 2-3 day peak fertility periods." (Zainab, Female, Senior Nurse/Matron in-Charge).

In addition, some health workers at the centre described a third method they called 'condom piercing method'. As the name suggests it is a local innovation whereby couples are instructed to pierce the tip of the condom before use. However, the safety of this method is in doubt:

"Another method that we have devised is the "condom piercing method" whereby they use the condom as they do normally but before doing so they pierce the tip of the condom to allow sperm to escape into the woman. This is to ensure that consistent condom use is undisturbed while achieving pregnancy whenever they so desire. We also advise that this be practised during the peak period of the woman's fertility." (Zainab, Female, Senior Nurse/Matron in-Charge).

Most health workers at this centre were not familiar with other technically more advanced methods of safe conception such as sperm washing, nor did they consider artificial insemination of donor semen and adoption due to religious and cultural reasons:

*"Honestly, these are the methods (*artificial insemination, unprotected sex at peak fertility and condom piercing*) that I am aware of and it is the method we advise our clients to use. You know this sperm washing we are not familiar with and donor semen and adoption are frowned at by the culture and religion of most patients. If these methods fail, we then refer them to the gynaecologist and fertility specialists for further management." (Zainab, Female, Senior Nurse/Matron in-Charge).*

This was confirmed by another health worker. He indicated that the safe conception methods offered at this centre to HIV-positive couples include unprotected sex at peak fertility, home or hospital assisted artificial insemination and 'condom piercing' method:

"Unprotected sex at peak fertility, home and hospital assisted artificial insemination and condom piercing are available but not sperm washing or donor sperm insemination." (Dr. Hadi, Male, Medical Officer).

As per the success and safety of the methods on offer, some health workers indicated that they have successfully counselled HIV-positive couples to achieve safe conception and HIV-negative babies:

"I myself have given this advice to many couples – I have lost count and a number of them have conceived using these methods. To give you rough estimates – I have advised more than one thousand in my one and a half years of practice here. I remember three of these couples coming back to tell me they have conceived." (Dr, Hadi, Male, Medical Officer).

The centre's director indicated that they referred couples requiring more advanced methods to the obstetricians as a result of their limited knowledge and safe conception skills:

"No, limited counselling and information is provided to highly motivated patients who are interested in more advanced techniques such as sperm washing. But we do not provide these highly technical methods routinely. However, we offer linkages with reproductive health units and specialists within and outside the larger hospital to help them achieve pregnancy if they so desire." (Dr. Mustapha, Senior Physician/Project Director).

Health workers also mentioned the hesitation of some HIV-positive couples from using any of the options provided at the centre or in the referral specialists' units due to two factors: first is the perception of safe conception methods as unnatural and the belief that they can achieve pregnancy the natural way. Secondly, they do not trust the health workers at the referral units as much as the ones at S S Wali centre:

"The problem is not from the hospital staff, it is from the clients themselves who do not accept that something is wrong with them; hence they would want to conceive children the natural way. The relief they get from ARV drugs conjures strength and confidence and make them belief that they are capable of doing it like other people. Also, when their viral load is low and their wives and babies are not becoming HIV-positive – they tend to become complacent and have contempt for HIV believing they are as normal as they can be." (Kande, Female, Adherence Counsellor/Program manager).

The centre's director suggested further training to improve health care workers' knowledge and capacity to provide safe conception counselling and services. In addition, he suggested a stronger collaboration with other units and provision of essential equipment:

"I think the centre is not yet fully prepared for now to address HIV-positive men's reproductive health issues. May be if more equipment are provided, training and collaboration with obstetrics and gynaecology department, this could help. This is necessary as there are many recent advances in this field beyond our facilities and knowledge." (Dr. Mustapha, Senior Physician/Project Director).

The health workers were also keen to learn about advanced methods of safe conception to serve their clients well:

"Yes, of course our health workers are keen to learn these advanced methods. Our HIV-positive male clients will also appreciate it very much because they don't like this idea of condom at all as they want to have many children." (Zainab, Female, Senior Nurse/Matron in-Charge).

8.5.5 Reproductive outcome for HIV-positive men

Health workers reported that most babies born by HIV-positive couples are now HIV-negative as a result of the effectiveness of the PMTCT programme. However, an unsolved challenge was the difficulty parents faced about disclosing to adolescents who acquired the infection before the availability of PMTCT at this site:

"*Unlike before, most of the babies born by HIV- positive couples are HIV-negative in the last 2-3 years. Up to 90% are free of HIV. Our main problems are children who acquired HIV years ago when PMTCT was not available at this centre. They have been taking drugs as children without knowing what it was for. Now that the children have grown up to 15-16 years, they need to be transferred to Adult ART clinics and must be told that they are HIV-positive and that they have been so treated. So the parents come to us and say they don't know how to disclose to their children. We have to sit down with the children and talk for a long time tracing the issue from the beginning and removing jargon and finally disclosing to the children who are now young adults. Not an easy task." (Bintu, Female, Chief Counsellor).*

This is a very difficult part of their work. Regarding this particular issue there appears to be a high level of trust between the patients and the staff, since parents were prepared to share this very painful issue with the staff. This demonstrates that the quality of the staff/patient relationship tends to vary. While staff talked about their close, intimate communications with patients, at other times they exert pressure when they deem it to be necessary (e.g. the point about withholding drugs). In addition, the earlier points about safe conception also suggest

that patients like to come to the SS Wali centre but do not necessarily have the same level of trust or willingness to attend other hospital departments. The importance of staff/patient relationships and communications and its implications for service delivery will be further discussed in chapter 9.

8.6 Family planning counselling and uptake among HIV-positive men

Regarding family planning service uptake, two distinct issues emerged during interviews. These include the attitude and preferences of men and the capacity of the system to provide information and services to them. For instance, health workers provided family planning counselling routinely to women. However, this was not the case with HIV-positive men, except if they accompanied their spouses. Nonetheless, some health workers were of the view that the few men they had encountered were more receptive to family planning than their spouses:

"No, we don't counsel men on family planning, only women. Here again some limited counselling is available and referral to family planning unit for men and their spouses. Those that indicate particular interest in spacing or limiting the number of children are provided with these services, but this is by no means routine. This is largely due to lack of knowledge, skills and personnel. But I think the main reason is number, skills and specialization of the staff. Human capacity development challenge is the main reason."
(Dr, Mustapha, Male, Senior Physician/Project Director).

Health workers observed that some men accepted family planning as long as the procedure will be done on the woman. The few men that used condoms consistently did so to prevent HIV transmission rather than for contraception.

"The men accept family planning as long as the method will used by the woman. They are aware of methods for men but no way. It is an African thing. Men would always prefer their women to go through the painful procedure and not themselves. This is because they don't feel reproduction is their burden or responsibility." (Kande, Female, Adherence Counsellor/Program manager).

Some health workers were of the opinion that the difference in attitude towards family planning between HIV-positive men and their spouses was a reflection of fertility desires:

"I would say we have more men accepting because the men are not too keen on having many children; it is always the women here that want to have more children and dominate the household. You know some sort of competition happens in polygamous homes whether there

is HIV or not. So I would say acceptance level in the men will be in the region of 60% because most men feel the children they have are enough, they wouldn't want more, but the women want to have more and more." (Bintu, Female, Chief Counsellor).

Some health workers were of the view that family planning acceptance was higher among HIV-positive men compared to other men:

"Acceptance of family planning is higher among HIV- positive couples. This is because of the continuous health education and counselling that HIV-positive couples receive in view of the effects of having too many children on their health. Their counterparts do not have this opportunity. Also, HIV-positive men think about HIV with regards to all things in life including child bearing while the others are living their lives without any of such considerations." (Kande, Female, Adherence counsellor/Program manager).

In tandem with HIV-positive men's responses, the chief counsellor identified economic factors, diminished strength and vitality as reasons for the more favourable attitude of men towards family planning:

"Most of them are now accepting family planning because of two reasons. First their HIV-positive status which tends to discourage them from having many children and secondly the economic situation which is affecting both HIV positive and negative men but the HIV-positive men are affected more as many of them no longer have the energy to work hard like others." (Bintu, Female, Chief Counsellor).

In contrast, the matron in charge had a completely different view. She considered family planning uptake among HIV-positive men as low. In her view, women were more receptive to family planning while men do not only reject it; they also impede their spouses' access to these services:

"Family planning rejection is another big problem. Another big task. The woman will accept after counselling and telling her that her immunity is low and that she needs to rest very well for 3 to 4 years between pregnancies and have fewer children in order to strengthen her immunity. But the men refuse to cooperate to sign this form required by women to access family planning services. The women come to complain and we go through the officials of the men's support group to convince them to sign this form so that their wives can access family planning." (Zainab, Female, Senior Nurse/Matron in-Charge).

Health workers confirmed that as a matter of policy, no woman is provided family planning services without the endorsement of their husbands:

"Exactly! In this hospital you need the husband's permission and signature. Without the man's endorsement, women will not be given any family planning method. Really we have problems with HIV-positive men. They won't use condoms and they don't like giving permission or signing for their wives to be given family planning methods. I think they have

been particularly encouraged by the high success rate of PMTCT where most of the children are now HIV- negative. This is what enticed the men to want their wives to deliver like other women. Oblivious of the fact that HIV is still in their body and will continue to weaken their immunity. We use to tell the women that even HIV- negative women who deliver babies annually become exhausted and anaemic what more if HIV-positive women go through the same experience? The result would be that their CD4 will not rise and they will be sick all the time. So, the women understand but the men are stubborn. Yesterday in the clinic I had an encounter with one of such men. He came with his wife. She had about 18 months old baby and she was already 4 months pregnant again. So, I was now counselling her. The man turned his face away from me. When I asked the wife what the problem was, she said he is here with us. Please let him explain. Of course, the man kept quiet." (Zainab, Female, Senior Nurse/Matron in-Charge).

Regarding possible reasons why HIV-positive men wanted many children, some health workers partly blamed this on ignorance:

"I don't know. May be it is just out of wickedness. Even the children that they already have, they don't take good care of them. So, that is our main problem with these men. But with education like that man of yesterday he accepted after a long counselling session. He promised me that after she gives birth they will come for family planning. I asked him whether he wants her health to deteriorate? Which one would she face? Is it the HIV or the repeated unspaced pregnancies, delivery and breastfeeding? Also what about the burden of caring for so many children?"(Zainab, Female, Senior Nurse/Matron in-Charge)

8.7 Prioritization of HIV-positive men's sexual and reproductive health

The centre's director was of the view that sexual and reproductive health needs of HIV-positive men have been neglected compared to those of women. This was blamed on the general perception that reproduction is a woman's responsibility and how reproductive health services evolved. Other reasons were staff shortage, lack of skills, equipment and supplies:

"Largely they (men) are being neglected. The tendency is to address women's sexual and reproductive issues through PMTCT. Men's sexual and reproductive health is not prioritized and I think it is important to pay attention to this since men transmit HIV in this society both within and outside wedlock. The manpower on the ground has the capacity to be trained – I think the system is well organized, if only staff knowledge and skill related to safe sex, conception and integrated care are enhanced then more can be done regarding sexual and reproductive health of HIV infected men and their spouses. We need to train personnel, motivate them and provide the required equipment." (Dr. Mustapha, Male, Senior Physician/Project Director).

8.8 Challenges in SRH management of HIV-positive men

Health care workers identified lack of cooperation, stubbornness and non-adherence to instructions as major challenges when dealing with HIV-positive men:

"The first challenge is lack of cooperation. They seem to be in denial for long and don't obey simple instructions even if it is for their sake. Secondly, they easily default from their treatment claiming that it is due to the nature of their work. Compared to women, more men default from the clinic." (Kande, Female, Adherence Counsellor/Program manager).

In contrast, health workers were of the view that women were more cooperative and adherent to ART treatment for a range of reasons:

"Women are more cooperative and adherent to their ART drugs than men because of their ways of life. Women are mostly at home, so it is convenient for them to take their drugs. Men are not used to taking drugs. They are mostly outside. You know this is a lifetime treatment, no rest, no public holidays, no annual leaves and the HIV drugs unlike other drugs must be taken religiously at fixed times. It is a drug that you must take at the same exact time every day. If you continue missing 2 to 3 hours the virus will multiply and develop resistance. Some of our patients have been taking drugs for 15-18 years non-stop and are sticking to the time, especially women. We have been having 90% of adherence. And the men are the problematic ones who unlike women do not adhere very well due to work, travels and most importantly their very nature."(Kande, Female, Adherence Counsellor/Program manager).

These responses form a very interesting mix. They seem to recognise the material differences between men's and women's lives, and at the same time, there is also that broad reference to 'their very nature' - that point to deeply-embedded cultural ideas about gender.

Furthermore, stigma, men's unwillingness to attend counselling sessions, high staff turnover and increased workload were listed by some health workers as additional challenges:

"Well, - the issue of stigma is still there; it has reduced remarkably, but has not gone away. Their willingness to participate in counselling sessions is less than desired. The women are more enthusiastic and forthcoming. High staff turnover is a problem – you train staff but they leave – so the quality of services you render to patients decreases as your numbers decrease. Paradoxically the number of patients keeps on increasing. Men also hide their serostatus from their wives and take drugs alone." (Zainab, Female, Senior Nurse/matron in-Charge).

Some health workers wanted HIV-positive men to value their lives and those of others. This in their view could enhance adherence and partner disclosure:

"I will appreciate it if HIV- positive men get to value their lives. From self value you get to value others. So if they do have a positive attitude towards their own lives it will affect not only themselves, their partners, their children but the community at large." (Kande, Female, Adherence Counsellor/Program manager).

They also reported that the devolvement of HIV project management to local partners and government led to decreased funding and supplies. While drug supplies remained stable, maintenance and supplies have all suffered:

"We lack maintenance and supplies. When PEPFAR/IHVN were managing the project we had all that we needed but now that they have devolved these to the government of Nigeria and local partners, things are difficult. Although we have regular supply of ART drugs, laboratory consumables, maintenance and manpower are a problem now. You know we sometimes give patients money to go to private laboratories. The patient load is also too much for the few staff. Drugs for opportunistic infections are also a problem as our patients are unable to pay for drug revolving schemes. So, the pharmacy is reluctant to give us those drugs for opportunistic infections." (Zainab, Female, Senior Nurse/Matron in-Charge).

Health workers also reported that some HIV-positive men took advantage of some poor HIV-positive women. Using economic advantage and promises of marriage, they are able to lure unsuspecting women into risky sexual intercourse:

"We face so many challenges. One is their sexual behaviour. Some men hide their sero-status and engage in sexual intercourse with unsuspecting HIV- negative women. Also, they fail to use condom consistently and take advantage of these poor women. Majority of women are poor and so men use their economic power to lure them into unsafe sex. Desperate to get some money, these men get these women easily. Similarly some poor men are enticed into homosexual acts. This is however rare here." (Kande, Female, Adherence Counsellor/Program manager).

Health workers considered men as important agents for the spread of HIV within and outside marriage. They also blamed them for low uptake of pre-marital screening:

"Well – men constitute a large proportion of the vehicle for the transmission both within the marriage institution and outside of it. For the northern part of Nigeria which is predominantly Hausa Muslims, practice of polygamy is extensive – and the premarital counselling and screening is patchy. There are still men who are not well informed about how to protect themselves, their spouses and children against HIV. Talking about sexual promiscuity and having unprotected sexual contacts with commercial sex workers, men having sex with men among others. So I think men are a very important group as far as HIV spread is concerned hence they need to be targeted for counselling and health education to stem the epidemic of HIV/AIDS. They are important stakeholders and services related to safe sex and reproduction needs to also focus on them unlike the present state of affairs." (Dr, Mustapha, Male, Senior Physician/Project Director).

8.9 Management of STIs among HIV-positive men

Although health care workers advised HIV-positive men presenting with other STIs to use condoms consistently in order to reduce the risk of transmission, it was apparent that there were no standard operating procedures for handling such cases. Health workers treat co-morbidities if it is within their capacity otherwise they referred them to other clinics:

"Normally when they come, we explain to them the importance of using condoms even if the two partners are HIV-positive. This is because, ulcerative STIs increase the risk of transmission of HIV virus and even in sero-concordant partners (both being positive) if they are not using condoms, the intercourse could lead to the transmission and exchange of different strains of HIV (re-infection). When the different strains interact, it can make the ARTs ineffective. We treat those that we can handle and refer others to the specialist clinics." (Dr. Hadi, Male, Medical Officer).

A senior health care worker indicated the provision of STI treatment as part of the ART programme was in its early stages:

"As far as HIV treatment and counselling are concerned, some of our staff have been trained on HAST – this is HIV/AIDS and sexually transmitted infections and tuberculosis counselling. However, new members of staff have not been formally trained on this, but soon they would all be trained. So, I would say that some integration exists but it is sub-optimal." (Dr. Mustapha, Male, Senior Physician, Project Director).

Regarding HIV-positive men with other STIs, he confirmed that skilled health care workers handled cases of STI in addition to the provision of ART, while those without such skills referred them to specialist clinics:

"Some of us are able to treat STIs along with HIV treatment, but some less experienced members of staff refer them to specialist clinics outside the centre. So, it depends on the experience and skills of the staff on duty. The well trained ones offer both treatments and in fact other related problems like opportunistic infections are handled in a similar manner. The other specialists that manage STIs in these men are the Medical Microbiologists who run a separate Specialist clinic." (Dr. Mustapha, Male, Senior Physician, Project Director).

The attitude of health managers and workers towards provision of SRH services as part of comprehensive ART program was generally positive. However, they identified challenges such as workload, inadequate human resource, high turnover of staff, lack of capacity and supplies:

"I will support it (integration of STI services into ART) and most staff will also support integration, if we have additional staff, receive additional training, equipment/supplies and drugs." (Dr. Mustapha, Male, Senior Physician, Project Director).

The next section describes reported felt stigma among HIV-positive men in health care settings.

8.10 Stigma and discrimination in health care settings

Using data from in-depth interviews, this section describes HIV-positive men's perspective on stigma and discrimination in clinical settings. HIV-positive men were generally of the view that health care workers treated them well. This was also extended to members of their families during antenatal care:

"Yes, our relationship is 100% very good with the health workers. They advise us and are eager to help and assist us. The health workers are always receptive. Not only us, if you bring your pregnant wife, you will be linked up with the responsible matron who will assist her to register for ANC. They will take your contact address and telephone number and be reminding you a day or two before your antenatal clinic appointment. During the clinic visit, they check the woman and baby's condition and undertake relevant tests. They also advise on the importance of hospital delivery. Some people still don't value hospital delivery. But for me, all my seven children were delivered in this hospital." (Usman, 44 year old, polygamous).

Another man stated that the behaviour of health care workers in the ART centre was remarkably different from those in other parts of the hospital. He suspected that those working at the HIV treatment centre received special training in human relations and inter-personal communication. He recalled that in previous years, they suffered stigma and discrimination even from health workers, but that has almost disappeared now:

"Oh yes, the health workers have been very supportive right from the time I was diagnosed with HIV. I must say that the health workers at the SS Wali HIV Centre are friendlier than workers in other units of the hospital. I think they received some special training in human relations. They give us advice about life generally, about good nutrition, regular attendance at clinics, adhering to our drugs and much more. In addition, if we have any health problem that requires referral to other doctors outside of our clinic they facilitate that. Similarly, the discrimination that our members use to complain about years ago is all gone now." (Ibrahim, 42 years, two wives).

A HIV-positive health worker who was possibly infected in the workplace indicated that HIV-positive patients are now better treated. He attributed this not only to intensive training but also the enhanced allowances given to health workers by development partners:

"The relationship between HIV- positive patients and the health workers is very good unlike before. I must add that the relationship is even more cordial than it is with other non-HIV patients. This is probably a result of the training and retraining of health workers and enhanced pay by development partners. This coupled with the fact that no one is completely free from the risk of HIV infection as even health workers can get infected with HIV as in my own case. I never knew that I will be a patient in the clinic until months following this unfortunate incident." (Mahmuda, 48 years, monogamous).

Other respondents had similar views. However, they observed that some health workers were occasionally provoked by patients who flout their instructions. Similarly, from the patient's perspective, agitation could occur when queues are long:

"I think the health workers are trying their best to care for us, although they are being paid, but they put in more than they are paid for. Although as human beings sometimes they are provoked by some of us who do not follow simple instructions. Also, if the patient stays for long periods on the queue, some of them complained or became furious. But overall I think the health workers are doing their best." (Atiku, Male, 33 year old divorced student).

A respondent stated that even during health workers' strike, HIV-positive patients are still attended to at the centre. He also confirmed that it is patients that disobeyed instructions or those that don't keep their appointments that complained about health workers:

"Regarding health workers, we do not have any problem with them. They receive us well and treat us with dignity. For me, no problem. However, some patients do not follow instructions despite all the effort of the health workers. We know that without the health workers help most of us will not survive but still some patients are troublesome and disobedient. I am impressed with the health workers. Now you can see, despite the health workers strike, they still receive us listen to us, examine us, do tests and give us drugs. Me I am impressed with way the health workers are treating us, we Nigerians are stubborn, so we need iron hand. That is why I tell people that we need strong leaders like Buhari and Kwankwaso if not people including HIV patients can be stubborn. Whoever, you see the health workers shouting at, if you check it is the patient that provoked them. For example a patient who is supposed to come early around 8.00 am to collect his drugs, he will not come until 10.00 am. And when they come this late they insist that the health workers should stop what they are doing and attend to them with dispatch. So, for me there is no discrimination or stigma from the health workers. Also, there is no favoritism here. You must follow the queue to be attended to in an orderly manner. That's it." (Jobdi, Male, 44 year old, monogamous).

The next section examines the perspectives of HIV-positive men regarding availability and access to SRH services

8.11 Perspectives of HIV-positive men and controls on availability and access to sexual and reproductive health services

Using data from quantitative survey and in-depth interviews with HIV-positive men, this section describes reported availability and access to SRH services.

8.11.1 Men's access to sexual and reproductive information and services

Nearly all (99.6%) HIV-positive men and less than a fifth (14.8%) of the controls indicated that during clinic visits they were provided with information on safe sex, condom use and family planning. In contrast, safe conception information was provided to less than a fifth (15.6%) and 3.3% of HIV-positive men and controls respectively. Furthermore, information on PMTCT was provided to less than a third (32.2%) of HIV-positive men and 1.1% of controls. One HIV-positive man indicated that he was discouraged by a health worker from impregnating his wife (Table 8.1). No such experience was reported among the control group.

Almost all respondents in both groups were aware of the availability and location of STI treatment services in the hospital. However, STI and prostate cancer screening services were virtually unknown to respondents in both groups. Similarly, majority of HIV-positive men and controls did not know where to access safe conception services.

Table 8.1 Men's access to sexual and reproductive information and services

SRH Information provision	Response categories	Frequency (%) Controls	HIV-positive men (Post-diagnosis)
Safe sex	Yes	40(14.8)	269(99.6)
	No	230(85.2)	1(0.4)
	Total	270(100.0)	270(100.0)
	Pearson's chi-square	*P*<0.001	
Condoms	Yes	52(19.3)	268(99.3)
	No	218(80.7)	2(0.74)
	Total	270(100.0)	270(100.0)
	Pearson's chi-square	*P*<0.001	
Safe conception	Yes	9(3.3)	42(15.6)
	No	261(96.7)	228(84.4)
	Total	270(100.0)	270(100.0)
	Pearson's chi-square	*P*<0.001	

Family planning	Yes No Total Pearson's chi-square	58(21.5) 212(78.5) 270(100.0) *P*<0.001	265(98.1) 5(1.9) 270(100.0)
PMTCT	Yes No Total Pearson's chi-square	3(1.1) 267(98.9) 270(100.0) *P*<0.001	87(32.2) 183(67.8) 270(100.0)
Discouraged from considering fatherhood by health provider	Yes No Total	- 270(100.0) 270(100.0)	1(0.4) 269(99.6) 270(100.0)
SRH Services & referral provided			
STI screening	Yes No Total Pearson's chi-square	7(2.6) 263(97.4) 270(100.0) *P*=0.34	3(1.1) 267(98.9) 270(100.0)
Prostate cancer screening	Yes No Total	- 270(100.0) 270(100.0)	- 270(100.0) 270(100.0)
STI treatment	Yes No Total	268(99.3) 2(0.7) 270(100.0)	270(100.0) - 270(100.0)
Safe conception options	Yes No Total Fisher's exact	3(1.1) 267(98.9) 270(100.0) *P*=0.50	6(2.2) 264(97.8) 270(100.0)

8.11.2 Counseling on marriage

HIV-positive men indicated that health workers advised them to marry only HIV-positive women.

"We were told only to marry women who are HIV- positive as I did with my second wife. They said we should never make the mistake of marrying HIV-negative women, because we will infect them. If you marry a HIV- negative woman you have endangered her life. In my own case, I have two wives, how can I think of another marriage when I am thinking of how to feed these ones, the children and myself? (laughter)." (Dogo, Male, 60 year old, two wives (one seronegative and the other seropositive).

8.11.3 Counselling on safe sex

HIV-positive men confirmed during qualitative interviews that they received counseling regarding safe sex during clinic visits. They mentioned faithfulness and condom use as the

key messages health workers communicated to them to ensure that they don't transmit the virus to their partners:

"Yes, they tell us about the use of condoms and sticking only to our spouses. They also encourage us to ask them (health care workers) about anything that we don't understand." (Dogo, 60 year old, polygamous).

8.11.4 Counselling on safe conception

Describing the safe conception method he has learned, a HIV-positive man said health workers taught them how to identify their spouse's most fertile period. They were then advised to skip the use of condoms during that time, but to resume condom use when she conceives. He indicated that this safe conception method worked for him as evidenced by his seven sero-negative children:

"Health workers advised us on the steps to take to conceive safely as follows: If the woman is menstruating - towards the tail end of the menstrual period her uterus is not yet ready to conceive. You wait until two weeks before her next period she is likely to conceive. So, at that time if you want her to conceive, you don't use condom. If you are lucky and God wills she gets pregnant. Thereafter, you continue using the condoms again. I have seven children now and by the special grace of the Almighty God, they are all HIV- negative. Even the second wife that I married is pregnant and she is expected to deliver early next year." (Usman, Male, 44 year old, polygamous).

Another respondent described the steps involved in hospital assisted artificial insemination using husband's semen as explained to him by a health worker. He further stated that they were cautioned against sharing medication with their spouses:

"The doctor has advised us that if we so desire to conceive, we need to come and see him together with my wife for some tests to check that we are well enough. They will now collect my sperm and will know how to put it inside my wife's womb so that she conceives without getting her and the baby infected. I think they are going to do something like test tube baby. This they especially tell us to ensure they assess our CD4 and health status before our wives contemplate pregnancy. They also advice such couples not to share their medications. Each of them should keep his/her drugs separately. They advice that if our drugs are about to finish we must come to get refill rather than use our spouse's drugs. This they tell us because the drugs prescribed may be different for the husband and wife." (Abdullahi, Male, 33 year old monogamous).

8.11.5 Counseling on PMTCT

Regarding PMTCT, a respondent stated that pre-conception care involved an assessment of CD4 count and viral load. The woman was also commenced on ART whether or not her clinical parameters reached the threshold. Thereafter, she will continue with the ART for live.

Other measures include regular antenatal care, hospital delivery and nevirapine syrup for the newborn. He also stated that the baby was exclusively breastfed for 6 months and abruptly weaned unto complementary diet. This was a change from previous advice involving use of breast milk substitutes which led to the death of many babies.

"There is a program called PMTCT. As early in the pregnancy as possible or in fact even before the pregnancy there are steps to be taken. The first step before she conceives is she needs to be examined and her immunity level ascertained through tests, such as CD4 count and viral load etc. Are these parameters at levels when pregnancy can safely be considered? Then when she conceives, she will be instructed to come and start antenatal care as early as possible. She will be started on ART even if her immunity profile does not warrant that in the non-pregnant state. She will continue attending antenatal clinic regularly. When it is time to deliver, she should deliver in a hospital providing PMTCT. Nevirapine syrup is then administered to the baby as soon as it is born. The drug is to be given within 24 hours of delivery. The dose depends on the baby's weight. Initially mothers were instructed to avoid breast feeding and give artificial milk. However, this has now changed. Mothers start by exclusively breast feeding for 6 months. In fact my last born had one of the highest birth weights and what they use to measure baby's well being at birth what is it called now - ehh-Apgar score in this hospital. His birth weight was the best throughout that month." (Danliti, Male, 36 years old, monogamous).

Furthermore, HIV-positive men were told to support their spouses and provide them good nutrition and social support, especially during pregnancy.

"Yes, we do discuss with the matron at the clinic. She tells us that anyone who is HIV positive, if the wife conceives, he should take good care of her. He should provide additional care and support more than he has been doing before she became pregnant. He should also provide good nutritional food including vegetables, eggs and other highly nutritious foods. This she says will improve the health status and wellbeing of the mother and baby."(Ado, Male, 36 years-old, monogamous).

A man expressed his gratitude for having HIV-negative children. He attributed it to the counseling he had on antenatal care and hospital delivery which he strictly adhered to:

*"Yes and we are really grateful to Aminu Kano Teaching Hospital staff. They always give us health talk as to how to ensure that before our wives conceive, they have strong immunity and they also advice us and our wives to present early for antenatal care. Once you follow their instructions and most importantly the woman delivers in the hospital and the baby receives nevirapine within 24 hours, the baby remains HIV- negative." (Ado, Male, 36 year old, monogamous**:***

In contrast, a respondent denied discussing any such measures with health care workers. He blamed this for the divorce he suffered:

"I have not been told about this and I have not had such discussions. I really I think this is what precipitated this divorce. It is the issue of her wanting to have more children now. So, if

*there is any way that this can be achieved without getting HIV and she is convinced about it, it would have prevented this problem (*divorce*). Also you know she is still young and having two children is far from enough in northern Nigeria." (HabuFari, Male , 43 year old, polygamous)*

8.11.6 Counselling received on hospital delivery

Men were advised to ensure that their pregnant spouses booked early for antenatal care and deliver in hospital, preferably where they registered for antenatal care:

"When it is time to deliver, she should deliver in a hospital providing PMTCT. Nevirapine syrup is then administered to the baby as soon as it is born. The drug is to be given within 24 hours of delivery and continued for six weeks. The dose depends on the baby's weight. (Danliti, Male, 36 year old, polygamous).

8.11.7 Counseling received about breastfeeding

Men reported that health workers told their spouses to breastfeed without water or additional feeds for the first six months and to stop suddenly thereafter. This was to be followed by complementary feeding using local nutritious food.

"The instruction they give us is to breast feed for six months and then wean off the baby at once. Thereafter soya beans, pap and other meals are introduced to the baby from 6 months." (Ibrahim, 42 years old, Monogamous).

Other men indicated that their spouses were advised to breastfeed for 6-12 months. In addition, as part of the strategy to prevent transmission, mothers were also instructed on nipple care, cracked nipples and prevention of mouth ulcers in the baby:

"For breast feeding, the women are instructed to clean their breast and check to ensure there are no wounds or boils on the nipple. They are also to check the baby's mouth for ulcers as all these increase the transmission hazard to the baby. The baby is breastfed for 6 months. It seems others advice up to one year. For example one of my children was weaned at 14 months. He is now 2 years and a few months, healthy and without HIV infection." (Danjuma, Male, 35 year old Monogamous).

In addition to exclusive breastfeeding for 6 months and abrupt weaning, a respondent said they were instructed to bring the infant for further tests at 12 months:

"They told us that if the HIV- positive woman delivers she should breastfeed the baby for six months and stop abruptly. She should start giving artificial feeds in addition to the prescribed drug. After 12 months, the baby is brought back for tests. We did that and followed the instruction for our last baby and she is free of HIV." (Liman, Male, 49 years old, monogamous).

Another respondent recalled that at the beginning of the epidemic they were advised to avoid breastfeeding completely. However, this was later changed to exclusive breastfeeding for six months with abrupt weaning at the end of the period:

"Initially mothers were instructed to avoid breast feeding and give artificial milk. However, this has now changed. Mothers start by exclusively breast feeding for 6 months." (Danliti, Male, 36 year old, polygamous).

8.12 Chapter Summary

Health care providers reported that a multidisciplinary team provided health care services (counselling, treatment, care and support) for HIV-positive men at this centre. The same team manage SRH needs as far as their knowledge and skills allow. Cases beyond their capacity were referred to other specialists within the hospital. Although the health workers at the centre received extensive training in various aspects of HIV care, specific training in safe conception techniques was lacking. Health workers are desirous of continuing professional training and willing to acquire safe conception skills.

While policy documents on 1) HIV/AIDS treatment, care and support and 2) laboratory and other clinical standard operating procedures (SOPs), PMTCT and family planning were available, but guidelines for provision of SRH as part of a comprehensive HIV/AIDS treatment could not be confirmed. However, health workers and managers indicated their readiness to provide SRH services and ART in an integrated manner when human resource situation improves. They also highlighted patients' preference for receiving both services at the centre.

Recognising the importance of sexual transmission of HIV, health care workers took sexual and reproductive counselling seriously. They reported that though some HIV-positive men complained of reduced libido shortly after diagnosis, they seem to recover or even have a rebound when placed on ARTs. They indicated that some men reduced the number of partners and coital frequency to minimize sexual transmission. Others continued with their risky behaviours and low condom use.

With a substantial proportion of sero-discordant couples, some men did not disclose to their partners. This is complicated by the cultural tolerance for polygynous marriages. The extent

of counselling and treatment for STI and safe conception care was dependent on the skills of the attending health care worker.

Employing an elaborate match-making scheme, health workers and support group officials ensured compatibility and sero-concordance between suitors. In addition, some health care workers were in favour of compulsory pre-marital testing for HIV, hepatitis B and genotype. However, others insisted that it should be encouraged but voluntary.

Most health care workers indicated that HIV-positive couples have the right to procreate; however, they suggested fewer children for them to minimize vertical transmission. Most health workers were familiar with low-tech safe conception methods such as home or hospital assisted artificial insemination, unprotected intercourse at peak fertility and an unsafe 'condom piercing' method. They were less familiar with more technically advanced methods such as sperm washing and in-vitro fertilization, but were keen to learn.

Health workers felt that some men were even more tolerant to family planning than their spouses. However, most of them did not support it. They were also of the view that sexual and reproductive health needs of HIV-positive men did not receive the desired attention compared to those of women. HIV-positive men had a lower risk perception than controls.

HIV-positive men felt they are well treated with little if any stigma and discrimination, though this was a problem in the earlier days. They reported receiving counselling on PMTCT, antenatal care, delivery and post-natal care including family planning.

However, the issue of fertility desire and intention are not routinely raised or discussed during consultations with men. Some health workers already had positions about childbearing among HIV-positive men and their partners.

Chapter 9 Discussion, Interpretation, Policy Implications and Future Research

9.1. Introduction

The purpose of this study was to determine the sexual behaviour and reproductive preferences of HIV-positive men in Kano, northern Nigeria in the era of combination antiretroviral therapy (ART). In addition, the study compared responses obtained with pre-diagnosis behaviour of HIV-positive men and those of matched controls. Furthermore, it assessed the health care service response. To address these objectives, a sequential, explanatory mixed methods design was used. First, a quantitative study collected and analyzed survey data on HIV-positive men and matched controls, followed by in-depth interviews with a sub-sample of the survey participants. This process was supplemented with qualitative interviews conducted with a sample of health workers with clinical and managerial roles.

This final chapter discusses the key findings, identifies the contribution of the study to the existing body of knowledge and compares the findings with available literature. This is followed by interpretation, a discussion of strengths and limitations, and implications for future research, policy and practice.

9.2. Summary of key findings

9.2.1 Sexual behaviour of HIV-positive men

Do men remain sexually active after HIV-positive diagnosis? If they do, are there changes in their *sexual* behaviour? What are the reasons and motivations for such changes? How does the *sexual* behaviour of HIV-positive men compare with matched controls? What are the predictors of sexual activity? How do HIV-positive men understand and interpret their situation with respect to courtship and marriage? (Are there barriers, opportunities and cultural impediments?

These questions were answered in detail in chapter 6. Briefly, most HIV-positive men rated their libido as 'average' before (80.0%) and after (84.1%) HIV diagnosis. Over a tenth of these men (15.6%) reported 'high libido' before diagnosis while 9.6% did so after the test. The rest rated theirs 'low' at both times. The changes in libido following HIV-positive

diagnosis did not differ significantly overall and on sub-group analysis based on duration of diagnosis.This finding concurred with the themes that emerged during qualitative interviews. It was however, unclear if the heightened libido among some men following ART was due to improved health or due to a direct effect of the drugs.

All HIV-positive men reported that they were sexually active before testing positive to HIV. The majority (91.9%) of them indicated that they remained sexually active after diagnosis, with a minority (8.1%) becoming abstinent. A subgroup analysis revealed a significant post-diagnosis decrease in sexual activity among men that tested positive within a year of the study, but not among those diagnosed over a longer period.

Overall, respondents reported a significant reduction [median (IQR): 4(2) versus 3(2)] (P<0.05) in their coital frequency following diagnosis. However, subgroup analysis confirmed reduction in coital frequency among men who tested positive to HIV within the preceding year, but not among those diagnosed over a longer period. These changes were attributed to a perceived fear of infecting their partner, psychological effect of being HIV-positive, fear of the effect of high coital energy expenditure and nutrient loss (in semen) on their health.

Compared to matched controls, the proportion of self-reported sexually active HIV-positive men was significantly higher over the preceding six months (91.9% vs. 82.2%, P<0.05). HIV status, age, marital status, employment and reproductive intention significantly predicted sexual activity among HIV-positive men and controls. In contrast, only marital status and employment predicted the same among HIV-positive men, when analysed separately. In essence, most men engaged in sexual activity at a lower frequency after being diagnosed HIV-positive. The majority of marriages that took place before either partner tested positive to HIV endured after diagnosis while new ones were facilitated through a match-making scheme which evolved to encourage sero-concordant marriages. Despite this, some single men were hesitant about courtship and anxious about marriage out of concerns for infecting their prospective partners and future children.

Comparison (of libido and sexual behaviour) of HIV-positive men with the literature and its interpretation

The varied effects of HIV-positive diagnosis and ART treatment on men's libido found in this study are in agreement with previous research (Sarna et al., 2009; Tumukunde et al., 2010; Allen et al., 2011; King et al., 2011). Some researchers reported low libido and erectile

dysfunction among 50% and 48% of men respectively, following ART. This was attributed to emotional distress, weight loss, general malaise and raised oestradiol levels (Lamba et al., 2004). Others identified worries about horizontal transmission and re-infection as being responsible for the low libido (Keegan, Lambert & Petrak, 2005; Siegel, Schrimshaw & Lekas, 2006; Rispel et al., 2011). Libido loss was significantly associated with use of protease inhibitors, being symptomatic and advancing age (Lamba et al., 2004). In contrast, others found raised libido and improved sex life in the short term following ART (Wamoyi et al., 2011). They further reported that this waned over time, eventually reverting back to normal (Tindall et al., 1994; Palmer and Bor, 2001).

Studies in developed countries reported a considerable decrease in sexual interest (libido), pleasure and sex appeal following HIV diagnosis in both sexes (Keegan, Lambert, Petrak, 2005; Ortiz, 2007; Siegel, Schrimshaw & Lekas, 2006). The decrease in libido was attributed to depression, generalized wasting, fatigue, pains, muscle aches and paraesthesia. In addition, risk of transmission of the virus to sexual partners and protease inhibitors were blamed for the low libido and diminished arousal (Ortiz, 2007). Variations in duration of diagnosis and clinical severity of study populations, methods of measurement and reporting bias make it difficult to isolate the effects of ART drugs from those of HIV-positive diagnosis. This finding needs to be further explored by comparing libido and sexual activity among ART naive subjects with those on ART as recently reported in South Africa (Risher et al., 2016). The latter study found that a significantly lower proportion of HIV-positive men on ART (77.7%) were sexually active in the preceding year compared to their ART naive counterparts (88.4%). However, the 'test and treat' policy recently adopted by the Federal Ministry of Health of Nigeria makes this difficult because of ethical challenges posed by delay in commencing ART after a positive HIV test (WHO, 2015).

The proportion of men who remained sexually active post-HIV diagnosis (91.9%) in the present study was higher than the figure (70.6%) earlier reported in the same population prior to increased access to ART (Iliyasu et al., 2009). It was also higher than the reported proportions in South East Nigeria (56.5%) (Obi et al., 2009), Cameroon (55.9%) (Ndziessi et al., 2013), Uganda (72.9%) (Bunnell et al., 2006) and South Africa (75%) (Olley et al., 2005). However, it was similar to the reports from Kenya (90%) (Luchters et al., 2008) and Togo (92.2%) (Yaya et al., 2014). Conversely, the proportion of men reporting total abstinence in this study (8.1%) was lower than the corresponding figure (23%) from five countries

(Democratic Republic of Congo, Mali, Morrocco, Equador and Romania) (Bernier et al., 2016). The reported prevalence of sexual activity in some studies in developed countries (Crepaz and Marks, 2002; Niccolai et al., 2009) were also lower (70%). There is need to exercise caution when making these comparisons due to variation in timing, definitions, study population, design, measurements and settings. For instance, recall periods for sexual activity in the cited studies spanned from one month to 12 months (Bunnell et al., 2006; Luchters et al., 2008) or since diagnosis (Iliyasu et al., 2009) as against the 6 months used in the present study.

The proportion of sexually active HIV-positive men (91.9%) and controls (82.2%) was nearly twice the figure reported for the general population (42.9%) (NPC, 2014). This finding is paradoxical considering the expected negative effects of chronic debilitating illness, including HIV/AIDS on sexual activity (Bogart et al., 2006). While the improved health status following ART could partly explain the high proportion of men reporting sexual activity in the preceding six months, the remaining difference could be due to the demographic composition of the sample, reporting bias and the study methodology. In addition, there is the possibility of social desirability bias, as men tend to overstate or misreport their sexual activity (number of sexual partners, coital frequency etc.) to show off the extent of their conquest (Buvé et al., 2001; Clark, Poulin & Kohler, 2009; Kelly et al., 2013). The significant post-diagnosis decrease in sexual activity and coital frequency among men diagnosed in the preceding year, but not among those diagnosed earlier could mean a more accurate recall within a year or normalization of sexual activity on the long run. Cohort studies could distinguish between these two possibilities. Similarly, interviewing both partners in future studies could provide an opportunity to validate each partner's accounts, thereby enhancing internal validity. However, this is only practicable for spousal partners. External validation with DHS data has also been suggested (Buvé et al., 2001), bearing in mind the differences between studies in clinical settings and community based surveys. Nonetheless, the increasing proportion of sexually active HIV-positive men found in the present study buttresses the importance of developing a comprehensive SRH response to contain the epidemic.

The reasons given by men for reduced sexual activity post-HIV diagnosis concur with previous research where shock, fear of infecting the partner, concern about acquiring new viral strains and loss of interest were blamed (Wamoyi et al., 2011; Moore and Amey, 2008).

In addition, diminished libido (Lifshay et al., 2009), high coital energy expenditure, stress and fragile health status were cited as reasons for abstinence or reduced coital frequency (Gruskin, Ferguson & O'Malley, 2007; Undie and Benaya, 2009; Wamoyi et al., 2011). Furthermore, it was reported that some HIV-positive men changed their behaviour out of anger and considered abstinence as a form of penance for acquiring the infection through the sexual route (Undie and Benaya, 2009). Worries about nutrient loss in repeated ejaculation expressed by some men in the present study was not mentioned in other studies. An average ejaculate (of 3-4 mls) is reported to contain: protein 171mg, carbohydrate 11mg, cholesterol 3mg, sodium 10.2mg, zinc 5mg, copper 5mg, selenium 5mg and traces of calcium, magnesium and vitamin B12 (Rehan, Sobrero and Fertig, 1975; Dunn and Trost, 1989).

The reported profound effects of HIV-positive status and ART treatment on sex lives of the respondents concurred with findings in Tanzania. They reported learning new ways of having sex and changing their perceptions of masculinity from hitherto sexually adventurous 'macho' man to being a faithful partner in a carefully considered relationship (Balaile et al., 2008). In addition, reports from Uganda found that sexual negotiations took place in stable marital relationships, unlike before realising their HIV status. Furthermore, HIV discordant couples confessed that the situation destabilized the family with the sero-negative partner often reacting angrily and accusing the other of bringing the virus into their lives through marital infidelity. In common with the findings of the present study, they also identified sexual negotiations as their most formidable challenge. Couples also became pre-occupied with salvaging the marriage and protecting the uninfected partner, in the face of daunting challenges of survival, stigma and societal expectations. Strategies adopted by couples following the initial shock included abstinence, consistent condom use, bed separation, outsourcing to sexual partners outside wedlock and divorce (Bunnell et al., 2005; Chirwa et al., 2011). As found in the present study, some couples in Uganda were motivated to resume sexual activities as a marital duty, in order to save their marriage, maintain companionship and have children rather than for pleasure (Wamoyi et al., 2011).

The predictive role of marital status on sexual activity among HIV-positive men has earlier been reported from South Africa where being married or living with a partner increased the likelihood of sexual activity more than four-fold aOR=4.42(3.85-5.08) (Olley et al., 2005). This finding is also consistent with reports from Uganda (Bunnell et al., 2006). Similarly, a study in Kenya discovered that married or cohabiting HIV-positive couples were 8.3 times

more likely to be sexually active than single, divorced or widowed respondents (Sarna et al., 2008). Furthermore, in Papua New Guinea, marital status was by far the most important determinant of sexual activity among HIV-positive men (Man et al., 2013). This is not surprising as most of these cultures consider sexual intercourse as a conjugal obligation (Wamoyi et al., 2011).

HIV-positive men with low transmission risk perception were about three times as likely to engage in sexual activity. This is in consonance with the themes from the qualitative interviews and concurs with earlier studies (Akwara, Madise & Hinde, 2003; Adefuye, Abiona & Lukobo-Durrell, 2009). Although a recent review cautioned against overreliance on health behaviour theories without strong empirical evidence from longitudinal or experimental studies (Huebner, 2015), the low risk perception among men in this cross sectional study could be a manifestation of inadequate risk communication. Health workers in resource-constrained settings are often overwhelmed with little or no time for one-on-one risk counselling (Naicker et al., 2009). Misinformation from traditional healers and spiritualists potentially fill this void (Amzat and Abdullahi, 2008). In the short term, task-shifting to trained lower-cadre health communicators could address this in the short term. Unlike in the present study, other researchers attributed low risk perception to treatment optimism or dis-inhibition, a situation where men on ART tend to become complacent and feel invincible (Holmes and Pace, 2002).

The significant influence of fertility desire and interspousal communication on sexual activity could be traced to the high premium attached to child bearing in the study setting and the severe social consequences of childlessness. With such social pressure, the desire to procreate could override any considerations for horizontal and vertical transmission (Undie and Benaya 2006). This finding underscores the importance of proper counseling on safe conception options for couples.

The emergence of a match-making culture co-managed by PLWHAs and health workers confirms earlier reports among HIV-positive women in this setting (Rhine, 2009). Beyond ensuring treatment adherence, economic empowerment and self-esteem, the scheme organized sero-concordant and economically viable marriages. Marriage agency or brokerage is by no means new in Hausa culture (Smith, 1952). It was described in relation to the *Dillaliya*- a woman who goes from house-to-house selling wares. In addition to this primary

role, she also doubled as an undercover marriage broker, obtaining the details of single women and sharing same with potential suitors.

More recently, she faces fierce competition from the male equivalent called *Mai Dalilin Aure*, who has used information technology to his advantage. With little access to households due to cultural restrictions, he employs mobile phone applications on social media (Facebook, Instagram etc.) to surreptitiously connect prospective suitors at a fee (Kurfi, 2012). There have been reports of similar match-making schemes among PLWHA in Asia (Kennedy, 2009). Even during the pre-HIV era, it was common practice in Asia for parents to search for life partners for their daughters (Myers, Madathil & Tingle, 2005). Although this researcher is not aware of formal match-making schemes in other parts of Nigeria, investigators in south east Nigeria reported that HIV-free certificates have become essential requirements for church weddings, indirectly ensuring sero-concordance between partners (Smith and Mbakwem, 2007).

Regarding the influence of HIV-positive diagnosis on gender relations, this study shows some evidence of an apparent relaxation of cultural restrictions related to courtship. Hitherto, men were expected to declare their interest first and specify the qualities of their potential brides. However, under the match-making scheme, women could equally indicate their interest and preferences. This would be culturally frowned upon in the study area under normal circumstances. In addition, findings from this study suggest that HIV diagnosis sometimes engendered empathy and open discussion between partners. These provide avenues for addressing the underlying gender power differentials which occasionally increase the risks women faced including intimate partner violence (Iliyasu et al., 2011).

9.2.2 Risky sexual behaviour

In this study, reported consistent condom use among HIV-positive men before HIV diagnosis (9.6%) was significantly lower than after the test (18.9%) ($P<0.05$). Similarly, a lower proportion of controls (13.0%) reported consistent use as against (18.9%) among HIV-positive men ($P<0.05$). The reasons given for condomless sex by HIV-positive men include: lack of interest in condoms (79.0%), reduced sensation and lack of pleasure (12.8%). Others mentioned partner's refusal (3.5%), desire to conceive (3.5%) and partner being already sero-positive (1.2%). In addition, most controls (83%) wanted to have children and wondered why they should use condoms. Conspiracy theories regarding population control and genital

irritation from condoms emerged as additional themes. The proportion of HIV-positive men reporting >1 sexual partners before diagnosis (34.1%) was significantly higher than afterwards (20.8%) ($P<0.05$). Similarly, the proportion of HIV-positive men with multiple sex partners (20.8%) post-diagnosis was higher than among controls (16.6%). Furthermore, more than three-quarter (78.5%) of HIV-positive men disclosed their HIV-status to their sexual partners. Similarly, over half (56.9%) of HIV-positive men had sero-discordant partners compared to none among controls.

The prevalence of risky sexual behaviour was significantly higher among HIV-positive men (81.5%) compared to controls (22.0%). HIV status, age and employment status significantly predicted risky sexual behaviour among HIV-positive men and controls. However, when HIV-positive men were considered separately, religion, marital status and serodiscordance were significant predictors of risky sexual behaviour.

Comparison (of risky sexual behaviour) with literature and interpretation

Consistent condom use among HIV-positive men in this study (18.9%) was lower than the figures reported from South East Nigeria (27.9%) (Obi et al., 2009), Uganda (49%) (Tumukunde et al., 2010) and Botswana (87%) (Kalichman et al., 2007).

The low condom use among HIV-positive men with low risk perception in the current study is similar to the findings of a study conducted in Malawi. In the latter study, condom use at last sexual intercourse among correct risk perceivers (30%) was more than twice those of low perceivers (14%) (Prata, 2006).

The low perception of risk of transmission of HIV to sexual partners among more than a fifth of HIV-positive men is particularly worrisome as such men are unlikely to take precautions to protect their partners. This was demonstrated by the low condom use among HIV-positive men in the present study. Similarly, though a few men were aware of the risk of acquiring new viral strains by sero-concordant partners during condomless sex, the majority were not aware of this risk.

Inconsistent or incorrect condom use, high viral load, sexually transmitted infections, especially ulcerative types, multiple sexual partners (whether within or outside marriage) and higher coital frequency have been reported to increase the transmission risk to the HIV-

negative partner (Eaton et al., 2009; Todd et al., 2006). Pragmatic steps are required to encourage consistent condom use, early detection and prompt treatment of all STIs. Similarly, encouraging voluntary pre-marital counselling as part of pre-nuptial preparations and the provision of culturally-sensitive safe sex information and services to all community members, regardless of HIV status are essential measures to minimise the risk of transmission.

Most men mentioned lack of interest and decreased sexual pleasure as reasons for condomless sex. These findings concur with previous studies in northern Nigeria (Iliyasu et al., 2009), other parts of the country (Olowookere et al., 2013) and among PLWHAs in Uganda (Allen et al., 2011; Nakayiwa et al., 2006). Sero-discordant couples in Togo justified non-use of condom with the immense love they had for each other, the steady relationship and their doubt about the veracity of the diagnosis (Moore and Amey, 2008). The apparent prioritization of sexual gratification over risk reduction, especially in sero-discordant relationships and the mismatch between emotions and risk perception, remain a major challenge. Furthermore, the role of fertility desire as a deterrent to consistent condom use has also been reported by other researchers (Undie and Benaya, 2006).

Of note is the existence of conspiracy theories purporting deliberate production of biological agents to de-populate some groups (Bogart and Bird, 2003). Such theories were also associated with rejection of polio vaccination in northern Nigeria (Iliyasu et al., 2014). The erroneous belief that condoms are laced with harmful substances also found a stronghold in other parts of Africa (Thomsen, Stalker, and Toroitich-Ruto, 2004; Wekesa et al., 2014), and has been partly responsible for the negative attitude towards condoms not only in the present study, but also in reports from South Africa (Bogart et al., 2011) and the US (Bogart and Bird, 2003).

The higher proportion of HIV-positive men reporting >1 partners before and after diagnosis compared to controls is similar to previous reports from Botswana (Kalichman et al., 2007) and South Africa (Madiba & Letsoalo, 2014). This finding, together with the low proportion of men consistently using condoms during both periods could have predisposed these men to HIV infection. Regarding risk reduction, some HIV-positive men considered partner testing as imperative, they became more discerning and emphasized consistent condom use. In contrast, others engaged in sexual relations without disclosure to partners (Wamoyi et al.,

2011). A study in Zambia found that, following VCT, condom use increased from 3% to 80% among sero-discordant couples (Allen et al., 2003) while 35% of PLWHAs in Uganda engaged in high risk sex. Of those that were sexually active, 19% never used condoms while 40% used condoms inconsistently (Tumukunde et al., 2010). In contrast, another Ugandan study found a 70% sexual risk reduction after 6 months of ART, and most (85%) of those who did not change their behaviour wanted to have babies (Bunnell et al., 2006). In tandem with the findings of the present study, change in sexual behaviour was predicated on health preservation. Reduced number of partners and coital frequency was adopted first, since this decision was possible at the individual level and driven mainly by men. Condom use was perceived as more difficult, as it required negotiation after disclosure to female partners. Of concern was the fact that some cultural expectations were not supportive of these risk-reduction strategies. For instance, married couples were less likely to abstain or use condoms as that would prevent the much desired pregnancy.

Study participants indicated that risk reduction was motivated by the desire to protect their sexual partners, fear of spiritual retribution and counselling by health workers. The effects of religion on risky sexual behaviour seen among HIV-positive men in the present study has also been reported among young men elsewhere (Jayakody et al., 2014). Religioisity influenced the choice of friends and delayed sexual debut. However, once they became initiated, they were more likely to engage in unprotected sex as a result of the opposition to condom use by some religious groups. Another study in Ghana also showed an association between religion and risky sexual behaviour among men, but this disappeared on adjusting for other socio-demographic variables (Gyimah et al., 2010).

There were reports of increased risk taking as a result of dis-inhibition or treatment optimism in other studies (Kennedy et al., 2007; Eisele et al., 2009). It was reported that these men felt that the drugs made them non-infectious; especially if they had undetectable viral levels (Kennedy et al. 2007; Kerrigan et al. 2006). This is erroneous as evidence suggests that even with undetectable blood viral levels; the risk of transmission is not zero as there could be differences in viral load in blood and the genital tract (Marcelin et al., 2008).

The disclosure rate in this study (78.5%), was higher than figures reported earlier from northern Nigeria (66.9%) (Iliyasu et al., 2009), (62.8%) (Iliyasu et al., 2011). It is similar to

figure (77%) (Akani and Erhabor, 2006) from a Nigerian centre, but lower than (99%) (Onovo et al., 2015) another. Elsewhere in Africa, the rates range from 40% in South Africa to 71.4% in rural Uganda (39) (median; 62.9%) (Kiene et al., 2006; Bunnell et al., 2006; Simbayi et al., 2007; Kakaire, Osinde & Kaye, 2010; Ncube et al., 2012; Venkatesh et al., 2012; Wekesa and Coast, 2014). Higher rates of disclosure have been reported from the USA (88%) (Kalichman et al., 2016).The higher level of disclosure in the present sample may be a reflection of the study setting-being a treatment and support centre. The situation could be quite different in community-based studies. Despite the higher proportion of HIV-positive men disclosing their status to their partners, over a fifth of these men kept their partners in the dark. Reference to stigma as the main reason for non-disclosure concurred with the findings in other studies (Sethosa and Peltzer, 2005). In another study in South Africa, non-disclosure was due to fear of negative reactions, discrimination and concerns about confidentiality (Sethosa and Peltzer, 2005).

Two theories have been proposed to explain the process of disclosure (Serovich, Lim & Mason, 2001). They are the Consequences Theory and the Disease Progression Theory. The former suggests that a decision to disclose is arrived at after weighing benefits versus costs (Emlet, 2008) while the latter hypothesizes that people disclose their status when their HIV condition advances with signs that could no longer be concealed. Although the focus of these theories on end points rather than the process has drawn criticism (Chaudoir, Fisher & Simoni, 2011), findings from the qualitative interviews in the present study showed that disclosure was predicated on closeness, expectation of support and anticipated consequences which supports the Consequences Theory. An example of an adverse consequence, which was not seen in the present study, is the reported increased likelihood of having an outside partner on discovery of a serodiscordant partner's HIV-positive status. A study traced more than a quarter (27%) of new infections among serodiscordant partners to such an outside partner (Campbell et al., 2011). In contrast, disclosure and co-enrolment of family members has been reported to increase utilization of safe conception services (Spangler et al., 2014; Myer, et al., 2014).

The proportion of sero-discordant couples in this study (56.9%) is one of the highest rates in Africa, which range from 14.8% in Ghana (Ncube et al., 2012) to 50% in South Africa (Simbayi et al., 2007). It is much higher than the previous figure reported from northern Nigeria (15.0%) (Iliyasu et al., 2009), but similar to the figure among PMTCT clients (52%)

across the country (Onovo et al., 2015). Estimates report that up to two-thirds of couples affected by HIV are in serodiscordant partnerships in sub-Saharan Africa (Desgrées-Du-Loû & Orne-Gliemann, 2008). Serodiscordance increases the risk of spread of HIV among couples. For instance, a study estimates that 55% to 92% of heterosexually acquired new HIV infections occurred among serodiscordant partners with the woman being HIV-positive in 30% to 40% of couples (Curran et al., 2012). However, a recent review of 25 studies involving over ten thousand serodiscordant couples found that couples that consistently used condoms were 71-77% less likely to transmit HIV to the negative partner compared to inconsistent or non-users. Protection was higher if the man was the positive partner (Giannou et al., 2015). Apart from variations in study populations, methods and measurement, the timing of these studies, burden of the disease, low condom use, low partner testing and socio-cultural factors could explain some of the differences in serodiscordance rates.

In agreement with previous studies (Venkatesh et al., 2010; Wekesa and Coast, 2014), the main predictors of sexual activity in the present study were marital status, low transmission risk perception, fertility desire and inter-spousal communication. These factors ensure availability of a steady and willing partner. In addition, coitus is considered a marital obligation in the study area (Duze and Mohammed, 2006). Furthermore, those that perceived transmission risk as low would perhaps be oblivious of the dangers associated with sexual intercourse and continue as usual. Similarly, the desire to have children and discussing about it would likely spur partners into taking steps towards achieving their reproductive goals.

The combination of high sero-discordance rate, low risk perception and low condom use in the present study pose serious threats to the control of heterosexual spread of HIV in northern Nigeria. In addition, polygamy, inequitable gender power dynamics and high rates of divorce/re-marriage reported from Kano (Duze and Mohammed, 2006; Kurfi, 2012) are possible drivers of the epidemic in this part of Nigeria. This is further compounded by the low uptake of pre-marital screening for HIV (Habib, 2013).

9.2.3 Reproductive behaviour of HIV-positive men

What are the reproductive desires and intention of HIV-positive men in Kano, northern Nigeria? Are there changes in men's *reproductive* behaviour following HIV-positive diagnosis? If there are, what are the reasons? How does the *reproductive* behaviour of HIV-positive men compare with those of matched controls? What are the predictors of fertility

intention? How do HIV-positive men understand and interpret their situation with respect to fatherhood? These questions were answered in detail in chapter 7. Briefly, more than three-quarters (79.3%) of the HIV-positive men wanted to have more children. Similarly, over half (57.0%) of them planned to have a child within 3 years. While nearly a quarter (20.7%) of men felt their fertility desire had been reset downwards in view of the HIV-positive status, the majority denied any change (63.7%) while the rest reported an increase (15.6%). In addition, interview themes revealed that some men developed more affection for children after their HIV-positive diagnosis. Furthermore, others linked fertility desire with libido and expected more children as a result of their increased libido following HIV treatment. Compared to controls (91.1%), a significantly lower proportion (79.3%) of HIV-positive men wanted to have more children ($P<0.05$). Similarly, the proportion (57.0%) of HIV-positive men that intended to have a child in the next three years was significantly lower than controls (67.0%) ($P<0.05$).

HIV status, marital status and duration, employment and number of living children were significant predictors of reproductive intention among HIV-positive men and controls. However, taking HIV-positive men separately, their reproductive intention was predicted by aforementioned factors in addition to religion.

The fear of transmitting HIV to their spouses and children was uppermost on the minds of men who wanted fewer children. Others were influenced by economic factors, consequences of potential orphanhood and effects of repeated childbearing on their partner's health. Furthermore, some men were concerned about the stress of child-rearing on their health. In contrast, fertility desire was enhanced by spirituality and fear of divine retribution. Short marital duration, low transmission risk perception and fewer living children significantly predicted fertility intention among HIV-positive men.

Only 17% and 15.2% of the partners of HIV-positive men and controls respectively used any form of modern contraception. During qualitative interviews, some men expressed the opinion that limiting their number of children was outside their control. They indicated that this was determined by a supreme being.

Although nearly all HIV-positive men were aware of PMTCT, more than a third (43.5%) of them had an infected child. The proportion of HIV-positive men who practised any form of

safe conception was extremely low (<1%). In addition, poor obstetric outcome was common among couples before realising their positive HIV status.

Comparison (of reproductive behaviour) with literature and interpretation

The persistence of desire for fatherhood among 79.3% of HIV-positive men was lower than controls (91.1%) and the general populace (97.8%) in northern Nigeria (NPC, 2014). The figure from the present study is higher than those previously reported at this centre before the increased access to ART (61%) (Iliyasu et al., 2009) and from other African countries (range: 8.5% to 60%) (Apondi et al., 2011; Mantell et al., 2014). In essence, fertility desire and intention of HIV-positive men in the present study was substantially higher than in other African countries, but lower than that of the general population in northern Nigeria. To buttress this point, it is noteworthy that spouses of more than two-thirds of HIV-positive had conceived following the husband's HIV diagnosis. In addition, spouses of 13% of HIV-positive men were pregnant at the time of the study. In the US, the reported proportion of PLWHA desirous of future fertility range from 25% to 45% as against 35% in the general population (Leggett, 2011).

Like their contemporaries elsewhere, many of the respondents had fathered children prior to the illness, but some were afraid of bearing HIV-positive children, in view of the burden they would leave for their relatives after death (Wamoyi et al., 2011). Apart from differences in methods and demographic characteristics, this finding could reflect the high background fertility preference of the source population. Even within Nigeria, the northern region has consistently reported the highest fertility desires, total fertility rate and lowest contraceptive uptake (NPC, 2004; NPC, 2009; NPC, 2014). Therefore, it would be unwise to attribute these differences solely to the increased availability of ARTs. It is however, conceivable that ARTs enable recovery, and provide hope to HIV-positive men to pursue their life projects while re-setting their childbearing targets at slightly lower levels. It is also worth reflecting on contextual factors in most of sub-Saharan Africa. In this region, fatherhood is greatly valued and a high cultural premium is placed on having biological children (Caldwell and Caldwell, 1987; Isiugo-Abanihe, 1994). Larger family sizes place men on a higher social pedestal and provide the desired agricultural workforce in these mainly agrarian settings (Isiugo-Abanihe, 1994). In addition, children are considered an effective social insurance for the elderly (Cooper, Harries & Myer, 2007), especially where formal social security systems are non-existent or precarious as in most of sub-Saharan Africa.

Future studies could explore whether the lack of reproductive intent among some HIV-positive men is due to personal preferences, or to inadequate knowledge of how to protect their partners and children against HIV transmission. The difference in fertility desire between HIV-positive men and controls could partly be explained by fear of death, consequences of orphanhood, burden of child care, and dwindling income, as reported in other parts of the country (Oladapo et al., 2005) and elsewhere (Chen et al., 2001; Panozzo et al., 2003).

The reasons for the level of desired fertility among men in this study are shared by their counterparts in other studies. For instance, HIV-positive men in Uganda indicated that a child ‘‘brings hope and happiness’’ and gives them a ‘‘reason to live’’. For some, having children also signified a return to ‘‘normalcy’’ (Nakayiwa et al., 2006). Reproduction may be the evidence required for the restoration of self-esteem, dignity and normalization. This may be the compelling reason for some of them to bear children as reported in parts of Nigeria (Smith and Mbakwem, 2010). There was also the desire for individuals to ‘leave something of themselves’ behind after they died. For some men in South Africa, HIV infection and imminent mortality did not act as deterrents to having a child, but rather conferred increased urgency on attaining reproductive goals (Matthews et al., 2013). In contrast, community pressures existed for HIV-positive men not to reproduce (Mantell, Smit & Stein, 2009; Nakayiwa et al., 2006). Another deterrent to childbearing in this study echoed by their contemporaries in Ethiopia was the fear of transmitting the infection to the partner and infant (Berhan et al., 2008).

The low contraceptive uptake among HIV-positive men and controls could be explained by at least two factors: the high fertility desire in both groups and health care service factors impeding access to information and family planning services. PLWHAs who want to have more children are unlikely to be motivated to use contraception and vice versa. However, studies indicate that this may not necessarily be so (Rutenberg and Baek, 2005), as there are HIV-positive couples who do not use any contraception despite not wishing to conceive. Studies have found diverse levels of contraceptive uptake among PLWHAs. While a few studies showed a higher contraceptive prevalence (Johnson et al., 2009; Elul, Delvaux & Munyana, 2009; Delvaux and Nöstlinger, 2007), others report no such difference in contraceptive use by HIV status (Rutenberg and Baek, 2005).

The findings suggest that childbearing remains a social imperative among HIV-positive men and their partners, much the same as in their contemporaries, albeit at a reduced level. However, they faced unique challenges when making reproductive choices. These include concerns about infecting the partner and consequently the child with HIV. Others considered economic factors, stress, orphanhood and health effects of childbearing on their spouses. These worries however, were not reflected in the uptake of contraception, indicating a potentially high unmet need for family planning among these couples. Similarly those that wanted to have more children faced several barriers in accessing safe conception counseling and services as a result of an already overburdened health care system and the negative attitude of some health workers.

The study findings translate into a potentially large number of babies and women at risk of acquiring HIV infection from men. This clearly calls for action if Nigeria's unenviable global position as the country with the second highest number of HIV-positive children is to be reversed. Preventive strategies including the A, B, C approach, voluntary pre-marital counseling and testing, family planning counseling and services, PMTCT with men involvement, increased access to information and safe conception services have proved effective elsewhere (Chen et al., 2001). This suggests that more work needs to go into finding out how to integrate these approaches into the specific cultural and socio-economic context in northern Nigeria.

The poor obstetric outcome observed among some HIV-positive couples before realizing their HIV-status has been reported in earlier studies (Joseph, Biodun & Michael, 2011; Olagbuji et al., 2010). This could be addressed by early diagnosis through VCT, pre-marital and antenatal screening. These interventions, coupled with pre-conception and antenatal care could prevent the poor outcomes. In addition, the sizeable PMTCT knowledge-practice gap among HIV-positive men and inadequate response of the health care service to the needs of HIV-positive couples could among other factors explain the high proportion of HIV-positive men with infected children (43.5%). With evidence of transmission rates of <1% following PMTCT (Wekesa and Coast, 2013), it is particularly worrisome that this proportion of HIV-positive men have seropositive children. At present, it appears that men are invited only when their spouses test positive during antenatal care. The low uptake of PMTCT services could be addressed via strategies that encourage the active involvement of men. Health workers should partner with men and connect with their desire to protect their partners and children, in order

to improve uptake of PMTCT. Couple counselling and testing should be the norm. In addition, the disparity between desire to stop childbearing and uptake of family planning by HIV-positive men and their partners should be addressed through improved access to contraceptive information and services. As observed in this study, a peer to peer communication strategy seems to work well in this regard.

In tandem with previous studies, the number of living children, marital status, duration of marriage, employment and religion predicted fertility intention (Nakayiwa et al., 2006; Dessie et al., 2011; Iliyasu et al., 2009). An inverse relationship was reported between the parity and fertility desire of PLWHA in a previous study in northern Nigeria (Iliyasu et al., 2009) and in other African countries (Nakayiwa et al., 2006; Myer, Morroni & Rebe, 2007; Heys et al., 2009; Kaida et al., 2011; Mantell et al., 2014). Couples with fewer or no living children strive to have some or risk being ostracized. Similarly, those that married recently wish to have more children while those that have been married for longer periods desire less because they are more likely to have completed their family sizes. Employment status reflects income and health status. Those that feel healthy and have a source of income are more likely to desire to procreate since they have the means to support the family. Similarly, the influence of Islam, the predominant religion of respondents on contraceptive use and fertility has been reported previously (Westoff and Bietsch, 2015). Muslims in 28 countries used less contraception, married early, desire larger family sizes and practiced polygyny. The higher fertility preference persisted even after adjusting for co-variates (Westoff and Bietsch, 2015).This underscores the importance of putting these factors in context when counseling these couples.

Previous research also identified subjective health status as another important predictor of fertility desire, where those who felt healthier tend to favour childbearing compared to sick persons (Chen et al., 2001; Smith and Mbakwem, 2007). This was not demonstrated in the present study as nearly all men gave a positive assessment of their state of health.

Consistent with previous studies (Wekesa, 2012; Oladapo et al., 2005; Chen et al., 2001), the findings of the present study suggests that being infected with HIV dampens but does not eliminate men's desire to have children. Several factors predicted fertility intention and could be used in context to identify couples that are likely to desire future fertility (Bai et al., 2016). Therefore, health care managers and providers have a responsibility to communicate

accurately the risks and safe conception methods available to couples, free of personal bias, to allow for informed reproductive choice.

9.2.4 Health care service response

What services are provided to address the sexual and reproductive health needs of HIV-positive men and their partners? Are there policies, supported by adequate human resources, for the effective delivery of (SRH) care? How do health workers perceive the sexual behaviour of HIV-positive men and what is the attitude of health workers towards pre-marital screening and child bearing among HIV-positive couples? Furthermore, what is the level of SRH service uptake and stigma in health care settings? What are the challenges and expectations of health care service providers when addressing HIV-positive men's SRH needs? What external constraints impede access to appropriate health advice and services to enable HIV-positive men make informed choices about marriage and fatherhood?

These questions were answered in Chapters 5 and 8. Briefly, most men were diagnosed late when symptoms have taken a foothold. The majority discovered their HIV status following recurrent illness, during pre-operative investigations or as a result of their spouse's positive test during antenatal care. Other circumstances were a partner or child's health crisis. A few others were motivated by media messages or occupational exposure to take the test. At the centre, a multidisciplinary team provided counselling, treatment, care and support for HIV-positive men and their partners. The staff received extensive training in most aspects of HIV/AIDS care. However, hands-on training in safe conception and family planning was lacking. Health workers stated that they were willing to acquire these skills.

National policy documents on 1) HIV/AIDS treatment, care and support and 2) laboratory and other clinical standard operating procedures (SOPs), PMTCT and family planning were available. However, those for integrating SRH into a comprehensive HIV/AIDS treatment program could not be verified. Although HIV-positive men preferred receiving both ART and SRH services at the S S Wali Centre and health workers/managers were willing to provide it. However, staffing, skills and patient load were considered major impediments.

Recognising the importance of sexual transmission of HIV, health care workers indicated that they accorded considerable importance to sexual and reproductive counselling of HIV-positive men and women. They reported that some men complained about low libido shortly

after diagnosis, but that most of them tend to recover after commencing ARTs. They also believed that some of the men reduced the number of partners and coital frequency following diagnosis. However, this finding was by no means universal.

The substantial proportion of sero-discordant couples, practice of polygyny and non-disclosure constituted serious challenges to health care providers. They reported that the extent to which HIV-positive men and their partners were counselled and managed for STIs or offered safe conception services depended on the skills and experience of the attending clinician.

Employing an elaborate match-making scheme, health care workers and support group officials ensured socio-economic compatibility and sero-concordant marriages. In addition, most health care workers supported mandatory pre-marital HIV testing, with some calling for the inclusion of hepatitis B and haemoglobin genotype in the testing protocol.

Most health care workers respected the reproductive rights of HIV-positive couples. However, some of these workers recommended fewer children for affected couples to minimize horizontal and vertical transmission risks. Most health workers were familiar with low-tech safe conception methods (e.g. artificial insemination of husband's semen and unprotected intercourse at peak fertility). They also described a novel 'condom piercing' method. However, they were less familiar with more advanced techniques of sperm washing and in-vitro fertilization.

Health workers felt that most HIV-positive men were averse to family planning. They also reported that the sexual and reproductive health needs of HIV-positive men were not prioritized. Furthermore, they observed a lower risk perception among HIV-positive men than their untested/HIV-negative contemporaries. HIV-positive men reported a remarkable reduction of stigma and discrimination in hospital settings. They corroborated reports of health workers on uptake of PMTCT, antenatal care, hospital delivery, post-natal care and family planning information and services.

Comparison (of ART and SRH service provision at the S S Wali Centre) with literature and interpretation

Despite increased access to ART, most men were tested long after the appearance of symptoms. This practice led to delayed commencement of treatment and preventive measures as reported by others (De Cock, Marum, and Mbori-Ngacha, 2003; Dixon-Mueller et al., 2009; Gersovitz, 2011). VCT uptake has remained low in Nigeria and at regional levels, especially among men (NPC, 2014; NARHS, 2014). This is due to fear of the unknown, inconvinient clinic schedules, stigma and discrimination among others (Odimegwu, Adedini & Ononokpono, 2013). Although provider initiated counseling and testing have been suggested as a strategy for early diagnosis and treatment (WHO/UNAIDS, 2007), inadequate counseling and breach of confidentiality have been cited as drawbacks of this strategy (Yeatman, 2007). These tests are the gateway to treatment, support and preventive services (UNAIDS, 2008) and the context and circumstances warranting HCT could be associated with adoption of safe sexual practices (Bunnell et al., 2006). Strategies for improved VCT among men in this setting need to be implemented.

The use of the national HIV/AIDS treatment guideline adapted from global documents is not unique, as the same occurs in most other Nigerian centres (FMOH, 2010a). Although these policies partly addressed the sexual and reproductive health needs of PLWHA, specific challenges of PLWHA were only partly considered (National Policy on HIV/AIDS/STIs Control (FMOH, 2010a). Health workers observed scant information about men as a major short-coming of the documents and guidelines. This contrasts with the situation in other African countries, where the male participation in maternal and child health is encouraged and the needs of men and minority groups are better addressed (Wekesa and Coast, 2013; Matthews, 2010). Nigeria could borrow a leaf from these countries.

For instance realizing the critical role of men in reproductive health of women, non-governmental organizations together with the health authorities in Kenya developed persuasive and creative approaches to ensure men's participation in VCT and PMTCT. Apart from making health facilities and testing centres male-friendly, opening hours were extended to late evenings and weekends to cater for working men. A combination of entertainment, competitions and peer-facilitated small group discussions were used to engage men (Recce et al., 2010). Similarly, male volunteers were used as change agents among their peers in Uganda (Aluisio et al., 2011).

In South Africa, despite the severe strain HIV/AIDS placed on health service delivery, health worker brain drain and unsupportive policies on task-shifting, men's participation was improved through community education, infrastructural modification, re-organization of health services, flexible opening hours and health worker training. In addition, efforts were made to integrate HIV/AIDS services (ART, PMTCT) and other reproductive health services (antenatal, postnatal and family planning). A partnership between communities, non-governmental organizations, businesses and the government took on the challenge of addressing underlying attitudes towards gender equality, cultural and socioeconomic factors in order to reduce the HIV risk faced by women and children (Muriisa & Jamil, 2011). Some of these could be adapted to encourage the participation of men in prevention of HIV transmission in northern Nigeria.

A recent review of male partner participation in PMTCT in sub-Saharan Africa reported that their involvement was limited to the provision of money required to access such services (Manjate-Cuco et al., 2015). The review identified socio-cultural factors, expected gender roles, unreceptive health workers and lack of provision for men in such clinic as impediments (Manjate-Cuco et al., 2015). Similar reasons were found in another review which focused on countries in west, east and central Africa (Dunlap et al., 2014). Apart from socio-cultural factors such as gender, culture and religious factors that deter male participation, men who accompanied their spouses to antenatal clinic were viewed as being out of place, overtly jealous and being controlled by the woman (Nkuoheat al., 2010). The low attendance of men (1.8-32%) at ANC and PMTCT clinics across Africa (Chandisarewa et al., 2007; Msuya et al., 2008; Katz et al., 2009) were also attributed to rigid opening hours that coincided with the time men are suppose to be at work, logistical challenges, inadequate knowledge, unwelcoming or even hostile attitude of some health workers and lack of provision for men (Dunlap et al., 2014). Lack of male partner involvement reduces the chance of couple counseling, inter-spousal communication and uptake of VCT among men. The fear of societal stigma and discrimination also discourage both men and women from getting tested (Msuya et al., 2008; Auvinen et al., 2013). For women, there is the added concern of abandonment and violence (Morfaw et al., 2013; Auvinen et al., 2013). This situation is not much different from that reported from northern Nigeria (Iliyasu et al., 2010), suggesting that changes to the ethos and re-organization of these services to make them more considerate of male partners could enhance their participation.

Interventions that have been found to be effective in Uganda include: encouraging inter-spousal communication about sexual and reproductive health and VCT (Farquhar et al., 2004; Msuya et al., 2008), sending letters of invitation to men requesting them to accompany their spouses on subsequent visits and flexible appointment times for working men (Byamugisha et al., 2011). In Kenya, men responded more to in-person invitations (Osoti et al., 2014). This strategy did not increase interpersonal violence among couples. These methods of engaging men could be explored in northern Nigeria especially with the improvements in telecommunication services.

In consonance with the findings of the present study, peer-led communication methods were effective in engaging men in Kenya and the Democratic Republic of Congo. Similarly, religious leaders and groups were found to influence men to participate in antenatal care and PMTCT (Farquhar t al., 2004; Sherr and Croome, 2012). The revered position of religious leaders in northern Nigeria provides a similar opportunity.

Recognising the vital role of men in northern Nigeria, it is important to take deliberate steps to re-align policies for engaging them as partners in improving their health, those of women and children. Maternal health services should make provisions for spouses, introduce flexible schedules and re-organise in line with acceptable local cultural norms. Interpersonal communication skills should be improved among health workers and services should be couple-centred. There is a need to advocate to community leaders and influencers to communicate to men about their responsibility in protecting the health of all members of their families.

The view that HIV-positive couples should have fewer children is not limited to health care workers in the present study (Kavanaugh et al., 2013; Kawale et al., 2015). In addition, some workers suggested that men who had children prior to testing positive should not have anymore. They were of the opinion that PLWHAs should concentrate on survival rather than get involved in procreation, which was considered a function of the 'healthy' couples. Understandably, this stemmed from the desire to protect public health as reported by others (Moodley, 2014; Kawale et al, 2015*)*. However, this position is inconsistent with the provisions of the UN charter (UN, 1994) where HIV-positive couples like any other have the right to decide whether or not to have children. In addition, they have the freedom to decide on the numbers which must be based on adequate information, counselling and services (London, Orner and Myer, 2007).

Additional challenge faced by HIV-positive men was the lack of privacy in busy ART clinics which inhibited discussions about sex and reproduction. Interviews among PLWHAs in South Africa showed that they also avoided discussing such private matters during ART consultations for fear of rebuttal, hostile or unfriendly attitude of care providers and non-conducive counselling environment (Cooper, Harries & Myer, 2007). In another South African study, men indicated that they were largely ignored on the few occasions when such counselling was offered to their spouses (Matthews et al., 2013).
Even in centres that provided some SRH counselling and referral, men were rarely the focus. This neglect and 'reverse gender discrimination' starts even earlier, where women have ample opportunity of knowing their HIV status during antenatal care as part of PMTCT programmes while only a few men get to know their status during pre-marital screening, following spouse's positive HIV test, or when donating blood as previously reported from this centre (Iliyasu et al., 2011).

Evidence suggests that health care workers who are better informed about safe conception tend to be supportive (Kawale, 2015). Another challenge was the exclusion of men from reproductive health counselling sessions. Provider-initiated discussions around procreation could provide the opportunity for men to unveil their fertility desires as a first step towards counselling on safe conception. It is important to ensure that health care workers are trained to routinely counsel HIV-positive couples on their reproductive rights and safe conception methods. Clear guidelines should be provided for these as it has been reported to be effective in other developing countries (Kennedy et al., 2010).

Reasons for neglect of men's reproductive desires during routine consultations include: patient load, health care workers' negative attitude towards reproductive rights of HIV-positive couples, assumption about partner seroconcordance and non-disclosure to partners (Matthews et al., 2013). A related study also found that health care workers inquired about the reproductive desires of HIV-positive women during enrolment, but left out men (Matthews et al., 2014). Consistent with the findings of the present study, most health care workers referred couples desirous of conception to other specialist units. Inadequate knowledge, negative attitudes and inadequate skills among health care workers were similarly blamed in other parts of Africa (Matthews et al., 2014). Furthermore, despite the important role of other STIs in HIV acquisition, they reportedly received less attention during counselling compared to perinatal transmission (Matthews et al., 2014).

Health care workers in the current study highlighted the additional challenge of managing the reproductive needs of sero-discordant couples. The tension between personal inclinations and professional responsibilities was accentuated as a result of the obvious risk to the HIV-negative partner. This was worsened by lack of knowledge, skills and equipment for safe conception. Furthermore, the insistence of some HIV-positive men on having babies the natural way and their unwillingness to be referred to units outside the ART centre increased the risk to their partners and children. These difficulties have also been encountered by health workers in other parts of Africa, especially where partner disclosure has been denied (Crankshaw et al., 2014).

The negative attitude of most men towards family planning in the present study is consistent with previous reports from northern Nigeria (Duze and Mohammed, 2006; Kabir et al., 2003). While non-use of family planning by men in the current study could be related to suspicion, spiritual or religious factors, interviews conducted with men in other settings identified fear of side effects, poor contraceptive knowledge, misconceptions and inadequate skilled family planning providers as partly responsible (Steinfeld et al., 2013). In addition, others identified the exclusion of men from counselling for family planning (Patel et al., 2014). Inclusion of men during counselling sessions (Patel et al., 2014) and dispelling myths and rumours could address these gaps (Steinfeld et al., 2013).

The reduced stigma and discrimination reported by HIV-positive men in health care settings is consistent with other studies (Famoroti, 2013; Feyissa, 2012). This was not the case at the beginning of the epidemic (Reis et al., 2005) and in other parts of the country (Olalekan, Akintunde & Olatunji, 2014). A recent study in South Africa found that patients had experienced reduction in incidence of pre-operative tests without consent and disclosure by health workers (Famoroti, 2013). A hospital in Ethiopia reported that training on interpersonal communication and reduced patient load were effective strategies for achieving stigma reduction (Feyissa, 2012). However, despite these improvements, discriminatory acts regarding reproductive counselling of HIV-positive men and their partners has persisted (Bell et al., 2007). These subtle forms of discrimination may be more difficult to eliminate. It requires dispelling prejudices and re-orientation of health workers on sexual and reproductive rights among other strategies (Grossman and Stangl, 2013). The policy implications and recommendations are considered in the next section.

9.3. Policy implications and recommendations

In line with the research questions, this subsection discusses the implications of the study findings for policy and practice. In addition, it makes specific recommendations using the adapted conceptual framework to address the sexual and reproductive health needs of HIV-positive men and their partners considering the social setting and resource constraints.

9.3.1 Sexual behaviour of HIV-positive men

HIV-positive diagnosis and its treatment modified sexual functioning among men in various ways. Concerns about HIV transmission to the partner and child, psychological stress, energy expenditure and perceived nutrient loss diminished sexual activity and coital frequency among some men. However, a substantial proportion of them remained sexually active. There is, therefore, a definite need for health care providers to routinely counsel all HIV-positive men on sexuality, safe sex and risk reduction strategies (**A**bstinence, **B**eing faithful to an uninfected partner and **C**onsistent condom use). Although being HIV-positive does not preclude sexual feelings and engagement in consensual sexual activity, they should be encouraged to take necessary precautions to avoid transmitting HIV to their partners and consequently their offspring. This should be done at two levels: the health care service should be strengthened at all levels (primary, secondary and tertiary levels) through provision of well trained and motivated staff, improved infrastructure and supplies. In addition, they should provide information on transmission risks, encourage consistent condom use, ensure early detection and treatment of STIs, enhanced uptake of VCT and PMTCT services and infection control (Buvé, Kalibala & McIntyre, 2003). Secondly, an intersectoral approach should be used to ensure behavior change towards safer sex at the community level. The Transtheoretical model of behaviour change (DiClemente & Prochaska, 1982) should inform context specific, peer-led community intervention strategies to reverse the low condom use among HIV-positive men as achieved elsewhere (CDC, 1992). Men should be assisted to change their behaviours through the use of culturally sensitive messages delivered through appropriate channels including religious sermons, radio and television programs and printed material (in local language, English and Arabic) as successfully applied in other settings (CDC, 1992; O'Reilly & Higgins, 1991;Kagimu et al., 1998). At the precontemplation (first) stage of behavior change, short role-model stories should be used to appeal to men's emotions and psyche to facilitate transition to the next stage. The printed material (pamphlets, flyers and posters) should be delivered to men by peers (those who are within the same age

group and share their culture and behaviour). As men move to the higher stages of behavior change, programmers need to ensure supportive social environment to normalize consistent condom use among HIV-positive couples. Success factors identified in such interventions include recruitment of trusted and reliable community members as volunteers, adequate training, role plays and participation of role models (CDC, 1992; O'Reilly & Higgins, 1991).

The significant predictive roles of marital status and employment status on sexual activity implies that safe sex counseling guidelines should not be generic. In Kano, messages should be tailored to the needs of HIV-positive men (and their partners, if applicable) in the following categories (i) the single, abstinent, (ii) the single, sexually active, (iii) the married, monogamous, (iv) the married, polygamous, (v) the divorced and (vii) the widower. In addition, special attention should be accorded to couples that want to have children. They should be provided with information on safe conception options and associated transmission risks. Furthermore, important consideration should be given to dispelling myths and addressing misconceptions during counseling sessions. Guidelines and training manuals should reflect these perculiarities.

9.3.2 Sexual risk taking and condomless sex

Most of the reasons given for low condom use (lack of interest in condoms, reduced pleasure, partner's refusal, spousal's desire to conceive and the fact that the partner was already HIV-infected) require targeted strategic communication. The findings of the present study showed that peer-to-peer communication was an effective tool to encourage men to allow their spouses use family planning options. This should be combined with other culturally acceptable channels (e.g. sports, especially football, home videos and men only congregations) to communicate the dual role of the condom and normalize its use within marriage. Couples that want to bear children should receive information and safe conception services. The special challenges faced by men including those in polygamous marriages should be addressed. Men should be informed about the importance of consistent condom use and be empowered with negotiation skills. Policies and programmes should capitalize on the emotional connections and desire of HIV-positive men to protect their spouses and children in order to encourage consistent condom use. They should also dispel the perceived link between condoms and immoral, casual, and irresponsible sexual encounters (Smith et al., 2012). In particular, the notion that condom is to be used only with commercial sex workers but not with spouses should be strongly debunked.

Conspiracy theories regarding condoms should be countered with evidence from local studies. The local manufacture of condoms could also allay these unfounded fears and suspicions. Condoms should also be made thinner and sufficiently lubricated to improve sensation and reduce irritation. Here again, the peer to peer communication strategies should be employed to dispel rumours and change men's attitudes towards condoms (Fakoya et al., 2008). The reported restriction of the number of sex partners within and outside marriage should be encouraged among all men regardless of HIV status as a risk reduction strategy.

Clear guidelines and flow charts for STI management should be provided in each consulting clinic at all levels of care. It should be based on evidence and global best practices (Fakoya et al., 2008; CDC, 2010; WHO, 2010). HIV-positive men should have their sexual history taken at enrolment and updated every six months. These men and their partners should be counseled and provided SRH services to ensure a safe and satisfying sex life. They should be informed on how to access STI treatment together with their partners (STIs) (Fakoya et al., 2008). Pre-Exposure prophylaxis involving the oral administration of ART (tenofovir–emtricitabine) to the HIV-*negative* partner has been shown to reduce HIV transmission rate by 75% in Kenya and Uganda (Baeten et al., 2012) and 62.2% in Botswana (Thigpen et al., 2012). Although treatment as prevention (TasP) is yet to be adopted in Nigeria, health workers' knowledge and skills on emerging options for prevention should be updated through continuing professional education.

Current fertility and fertility desire/intention

The desire for fatherhood among a substantial proportion (79.3%) of HIV-positive men compared to 91.1% of controls suggests that in the era of ART in Kano, Nigeria, being HIV-positive reduced, but did not vitiate men's reproductive desires. The fact that more than half (57.0%) of the HIV-positive men in this study intended to bear a child within three years compared to 67% of controls illustrates the scale of the challenge. An obvious implication of these findings is that without effective SRH services, a substantial proportion of women and children face the risk of acquiring HIV horizontally and vertically. Although recent studies have shown that PMTCT interventions reduced vertical transmission to less than 1% in the developed countries (Wekesa and Coast, 2013), this requires strict adherence to PMTCT instructions, processes and medications, which is hardly the case in the study setting (Galadanci et al., 2013; Galadanci et al., 2008) and other developing countries. It is therefore,

necessary for health managers to prioritize the provision of information and effective pre-conception, antenatal, intrapartum and post-natal services for HIV-positive couples. Screening and PMTCT services should be offered at every point along this continuum to ensure that all pregnant women are reached, regardless of the point at which they access the health care service. For men in particular, their fertility desires and plans should be routinely discussed during the initial counseling sessions rather than being left to chance. Health care providers should be alert to the circumstances (number of existing children, employment, religion) and challenges of men in polygamous marriages, and those with sero-discordant partners. These men should be encouraged to disclose their status and bring all their partners for confidential counseling on sexual and reproductive matters singly or as a group, as appropriate. It is the joint responsibility of health care providers and the public health community to relay accurate sexual and reproductive health information, free of prejudice, to these men to support them to make informed choices and realise their dreams, safely. In addition, multisectoral approach should be used to create conducive social environment for behaviour change.

9.3.4 Family planning uptake

The low uptake of family planning among HIV-positive men, matched controls and their partners is not surprising, considering their high fertility desire. In addition, concerns about spiritual retribution, perceived lack of control and exclusion of men from family planning counselling could be responsible. Contraceptive uptake could be improved by communicating the advantages of limited and well spaced children. Men should be engaged through their social networks using peers and providing family planning counseling as part of routine consultations in the ART clinic. It is also important to ensure that health care workers understand the effects of ART on family planning methods, especially hormonal methods and encourage dual protection.

An overarching theme that emerged during qualitative interviews was the strong influence that spirituality had on: 1) men's reactions to HIV-positive diagnosis and coming to terms with HIV/AIDS 2) Sexual behaviour; practice of polygamy, attitude towards condoms and anticipating divine retribution if they infect sexual partners within or outside wedlock 3) fertility desire, intention and uptake of family planning. Religion was used as a positive coping strategy as reported by others (Cotton et al., 2006). In addition, it could partly explain the level of optimism displayed by HIV-positive respondents in the present study.

Researchers in other African countries reported on the strong influence of religion on peoples' lives (Ojo, 2000; Jenkins, 2002). It informed perceptions of HIV infection as a form of divine punishment or retribution for immorality or promiscuity as earlier reported (Trinitapoli & Regnerus, 2006; Adogame, 2007). In addition, researchers have reported that religious leaders had a lot of influence on their subjects, providing an opportunity to serve as vehicles for messages on behaviour change (Trnitapoli, 2009; Takyi, 2003). Understanding these view points and factoring them into messages could encourage adoption of safer sex and conception practices among men.

9.3.5 Concerns about safe conception

The misconceptions, dilemma and concerns of HIV-positive men about childbearing in this study reflect the limited knowledge of safe conception methods. This situation could be addressed by providing accurate and up to date information on safe conception to health workers. Health workers should not limit counseling to the risks of transmission and arrogate to themselves prescriptive powers for the reproductive rights of affected couples. It is the health provider's duty to counsel couples and allow them make reproductive choices without coercion (Wekesa and Coast, 2013; Laar, 2013). Even though facilities offering safe conception services are scarce in developing countries, efforts should be made to address the needs of these patients within the limits of available resources. Health care workers should initiate and encourage discussions on safe sex and reproduction with both men and women. The involvement of men in reproductive health has been identified as an important strategy to gain their support for a safe family life (UN, 1994).

9.3.6 Reproductive rights and decisions

Policies and programmes to meet the SRH needs of PLWHA should be rights-based. PLWHA, like all human beings, have a right to safe, pleasurable sex and a right to build a family. They have the right to make SRH decisions without coercion, stigma or discrimination. PLWHA should therefore be informed and supported to make informed decisions about sexuality, positive living and parenting. The current reality is that most sero-discordant couples in this setting either reproduced in the natural way (McDonald, 2011) or at best used methods that are not entirely safe (unprotected sexual intercourse at peak fertility, hospital or home-assisted artificial insemination of sperm from HIV-positive partner) (Wekesa and Coast, 2013; Matthews and Mukherjee, 2009). In addition, some of them used

the ‘condom piercing’ method whose safety and effectiveness have not been ascertained. This is particularly worrisome and is a wake up call to the health authorities.

Drawing on global best practices and the guidelines of the British HIV Association (BHIVA) (CDC, 2010; Fakoya et al., 2008; WHO, 2010), health care workers should routinely discuss fatherhood with HIV-positive men at enrolment and during follow up. They should also request men to raise this issue with their partners. Those that have completed their families or want to space their children should receive family planning counselling and services. The methods should be appropriate with consideration for the decreased efficacy of hormonal methods from interaction with ARTs (CDC, 2010). They should be cautioned that consistent condom use should continue despite partner’s use of hormonal methods. The combination is important as it serves a dual protective role by minimizing contraceptive failure and preventing HIV transmission.

HIV-positive couples planning to have children should be counselled on safe conception options and the transmission risks associated with each method, so that they can make informed decisions. Before contemplating pregnancy, both partners (and all partners in polygamous settings) should be screened and treated for STIs to reduce transmission risks. Semen analysis should also be offered as a precaution to avoid exposure to infectious genital fluid when the chance of conception is very low (e.g. couples with low sperm count or azoospermia (CDC, 2010). The HIV-positive partner (in serodiscordant couples) or both partners (in sero-concordant couples) should be on optimal ART adherence with viral load measurement below detection limits (CDC, 2010) before conception. The following options have been suggested in situations where the man is HIV-positive while the woman or women (in polygamous settings) are sero-negative:

(1) Home or health facility artificial insemination using screened donor sperm-this has been identified as the safest option. It effectively removes the risk of viral transmission if the donor had been screened for HIV and other blood-borne viruses. However, it also removes the option of genetic parenting by the infected male. There may be strong socio-cultural and religious objections to this method particularly in Kano and other parts of northern Nigeria.
(2) Sperm washing: the female partner is inseminated artificially with the infected partner’s sperm, centrifuged first to separate out virus-free spermatozoa. Using a sterile pipette, the spermatozoa are deposited in the uterine cavity (intrauterine insemination) or injected directly

into harvested ova (intracytoplasmic sperm injection). The disadvantage of this approach is the high cost and non-availability of the technology and expertise for sperm washing in the study setting and other resource-limited settings.
(3) Adoption: this is another option for HIV-positive couples, but its cultural acceptability in northern Nigeria is likely to be low.

The use of unprotected sex at peak fertility, home or hospital artificial insemination of husband's semen without washing and the 'condom piercing' methods reportedly used by some health care workers at this centre carry substantial risks of horizontal transmission if the man is HIV-positive. Furthermore, the risk associated with having babies the natural way among sero-discordant couples could even be higher. Although not yet standard practice, combining optimum ART treatment for the HIV-positive partner to undetectable viral load levels and pre-exposure prophylaxis for the HIV-negative partner hold promise in reducing the risk of these sub-optimal methods of conception in Nigeria and other low-resource settings. This possibility needs to be investigated further.

If only the woman is seropositive, home or hospital artificial insemination (with the husband's sperm) at peak fertility is offered to the couple. The partner either uses a spermicidal-free condom during intercourse or ejaculates into a sterile cup. The ejaculate is withdrawn using a needleless syringe and placed high up in the woman's vagina. If both partners are HIV-positive, sperm washing is done first, followed by hospital artificial insemination with the husband's washed sperm or realistically timed unprotected sex has been suggested for seroconcordant couples in resource-limited settings (Cooper et al., 2009). It is critical to investigate further, the feasibility, acceptability and affordability of these safe conception methods in low resource settings where the need is most.

9.3.7 Averting vertical transmission

From the findings of the present study, most HIV-positive men with seroconcordant or serodiscordant partners engaged in condomless sex, had children after testing positive and plan to have more in the near future. They are mostly unaware of safe conception methods and prefer conceiving the natural way. In addition, even at this tertiary health facility, safe conception knowledge and skills among health workers was inadequate and the options on offer are limited to home or hospital artificial insemination and an untested 'condom piercing method'. In addition, only a few men indicated ever using these methods. Furthermore, the

cultural attitude towards adoption and use of donor semen, and the near absence of high-tech methods such as sperm washing pose a serious public health challenge for preventing both horizontal and vertical transmission of the virus.

To prevent this, urgent action need to be taken. Apart from improving PMTCT uptake, the A, B, C approach, voluntary pre-marital counseling and testing, family planning counseling and services. In addition, there should be increased access to pre-conception care, safe conception information and services, men involvement in PMTCT, and initiation of ART in all pregnant and breastfeeding HIV-positive women, regardless of CD4 cell count and it's continuation for life (Option B+) as recently recommended (WHO, 2015).

9.3.8 Breastfeeding is best

The WHO now recommends that HIV-exposed babies should be exclusively breastfed like their unexposed counterparts. The exposed babies are also to receive a daily course of nevirapine for six weeks from birth. Furthermore, these babies are to be weaned abruptly from breastmilk at six months followed by complementary feeding. Early and final infant diagnoses are advised at six weeks of life and 18 months respectively (WHO, 2015).

9.3.9 PMTCT knowledge-practice gap

The wide PMTCT knowledge-practice gap among HIV-positive men could partly explain the high proportion of men with HIV-positive children (43.5%). The low uptake of PMTCT could be addressed through the early engagement of men, improved access to family planning information and services and provision of low-tech safe conception methods. Second, culturally sensitive community-centric health communication approaches should be developed to disseminate information on the socioeconomic and health-related benefits of well-spaced and planned families. These recommendations could help address the high incidence of vertical HIV transmission in northern Nigeria.

9.3.10 Men's involvement and couple counseling in SRH services

Men in this setting and elsewhere have rarely been targeted by sexual and reproductive health interventions (Wekesa, 2012; Kabagenyi et al., 2014). This has implications for HIV prevention and treatment. The late diagnosis observed and non-disclosure by some men combines to endanger not only their lives but those of their sexual partners in and outside of marriage. Encouraging uptake of voluntary counseling and testing and partner disclosure

provides an early opportunity to address treatment and sexual and reproductive adjustments. Situations where women are denied access to family planning as a result of lack of husband's consent is untenable and need to be reversed.

9.4 Health care services

The WHO recently recommended the 'test and treat' strategy which entails the commencement of ART at all levels of CD4 count (WHO, 2015). Nigeria's Health Minister announced the adoption of this treatment strategy during the 2016 world health assembly. This translates into an increased workload. The implementation of this policy requires commensurate improvement in the number of trained staff, along with drug supply to cope with the anticipated increased number of patients. The current tempo of training of the multidisciplinary team at the centre should be sustained, but should henceforth be needs-based. Specific attention should be paid to the skills deficit on safe conception methods, STI management and contraception. The desire for continuous professional development and the willingness to acquire new skills is an opportunity that should be utilized.

The substantial proportion of sero-discordant couples, practice of polygyny and non-disclosure by some men constitute serious challenges to the health care service. In order to prevent horizontal and vertical transmission of HIV, health providers need to be well-informed and have the required attitude and skills to counsel and manage pre-conception risk behaviour and provide safe conception services to HIV-positive couples. Rather than offering a list of techniques that are unavailable or unaffordable, health care workers should counsel couples on realistic and feasible safe conception methods within the available resources. Further research should be conducted into methods of conception that are feasible in developing countries.

Recruitment of qualified health workers could reduce the workload and provide more contact time during consultations for addressing the unique challenges of HIV-positive couples. In addition, the provision of SRH services as part of ART treatment programme could reduce the default that occurred during referral of couples to other units. Regarding human resource for health, Nigeria has one of the largest pools of health care professionals in Africa (WHO, 2008). However, there are great variations in the numbers working in urban and rural areas and between northern and southern parts of the country. They are concerntrated in urban

areas and in the south. It is therefore necessary to address this mal-distribution through incentives and supporting voluntary rural postings for newly qualified or retired health care professionals. In addition, ART services should be scaled up to improve access and reduce the work load in urban tertiary hospitals.

The match-making scheme and state organized mass weddings seems to have worked well. However, despite the support for pre-marital screening by some HIV-positive men and health workers, making it mandatory raises several concerns. First, this could discourage those that are in doubt about their status from getting married or encourage the emergence of fake HIV-free certificate syndicates. Second, it impinges on confidentiality, freedom of choice and sexual and reproductive rights of individuals. However, some have argued that it is also the right of sexual and marital partners to know the sero-status of their partners before any intimate sexual encounters (Dixon-Mueller, 2007). Regarding stigma, the strategies that have successfully reduced stigma and discrimination against PLWHA in health care settings should be adopted at the community level.

9.5 Comprehensive SRH and HIV/AIDS Services

The preference for SRH and ART services from the same health care providers among HIV-positive men and their partners should be respected. Clear guidelines, enhanced health provider capacity, adequate supplies and logistics are essential as earlier suggested (Wekesa, 2012; Hope et al., 2014). Doing so could prevent the loss of couples during referral to other units outside the centre, reduce vertical and horizontal transmission risks and enhance client satisfaction. Health training institutions should be strengthened to produce more qualified staff while better condition of service and incentives should be provided to retain staff. Essential drugs and commodity lists should also be prioritized to prevent stock-outs.

9.6 Study limitations

The present study had several limitations which need to be considered when attempting to generalize the findings. The first limitation is that discussions about sexual behaviour are widely considered taboo or off-limits in the study setting. In addition, HIV-positive men could perceive any questioning regarding their sex lives as intrusive and implying moral judgement on how they acquired the infection. Therefore, responses could be susceptible to

social desirability bias (Chillag et al., 2006). However, the provision of adequate information about the study objectives, assurance of confidentiality, privacy and use of same-sex interviews could have minimized any such bias. The second limitation relates to the average period of two years since diagnosis in this sample, which increases the possibility of recall bias. However, limiting the detailed account to penetrative penile-vagina sex in the six months preceding the interview was meant to guard against this. Furthermore, the discovery of differences in sexual activity and coital frequency on sub-group analysis could be explained in two ways. First, the longer the duration of diagnosis, the less accurately one might recall post-diagnostic changes in sexual behaviour. Or second, the waning over time of the effects of the immediate shock and psychological impact of receiving news of a positive HIV status may have an effect on sexual behaviour.

The third limitation is the cross-sectional study design which restrict the drawing of any causal inferences. However, the study provides baseline understanding that could contribute to the design of an interventional study, for instance, to determine which behaviour change strategies might be most effective. Fourth, the differences between HIV-positive men and controls by place of residence, employment and income could partly explain variations in access and utilization of sexual and reproductive health services, as observed elsewhere (Leta, Sandoy and Fylkesnes, 2012). Chronic illness such as HIV/AIDS could also affect employment and income negatively through decreased productivity and absenteeism. In addition, PLWHA could face discrimination in employment opportunities making them less likely to be employed (Ibrahim et al., 2008).

Finally, the way the research questions were framed meant that it was unlikely that respondents would volunteer information on same-sex sexual activities. Since such activities are highly stigmatized and criminalized in Nigeria, people are unlikely to volunteer such information; therefore a different approach will be required to study sexual minorities. Nevertheless, this study addressed an important area of research in a historically under-studied geographic entity. The focus on men, specifically, heterosexual men, its comparative nature and matching of controls from the same hospital by age, educational status, religion, ethnicity are strong points providing a unique opportunity to understand the behaviour of HIV-positive men and their contemporaries in the unique cultural setting of Kano in northern Nigeria.

9.7 Strengths of the study and contribution to Knowledge

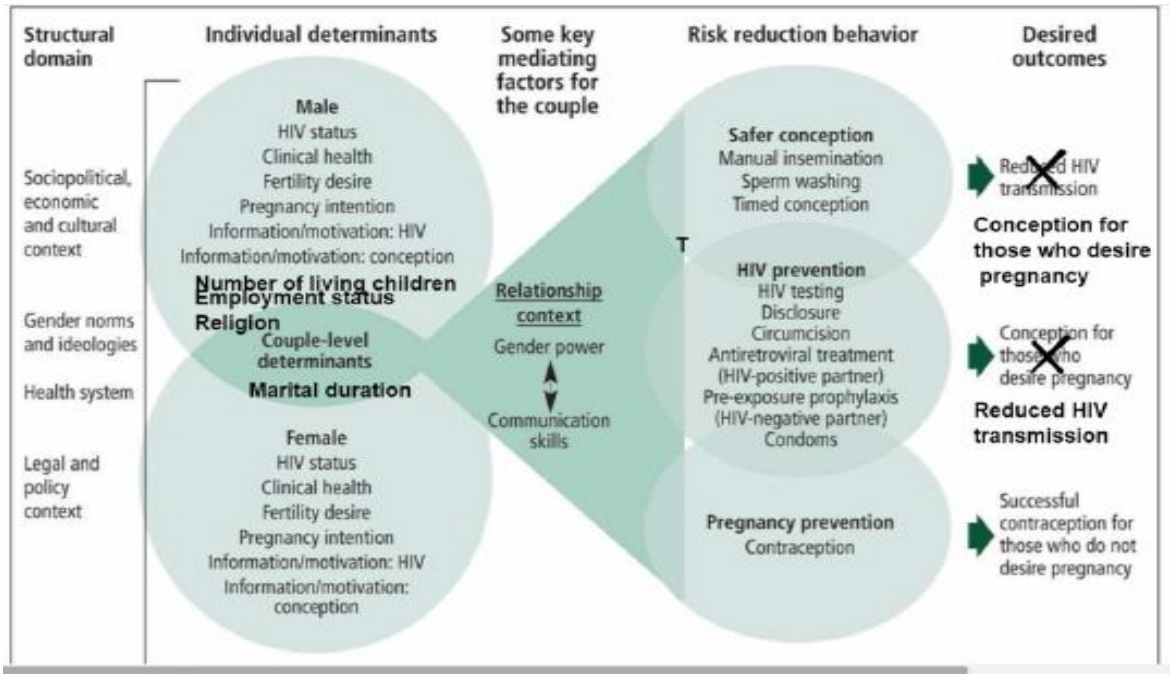
This work is unique in many respects: to my knowledge, it is the first to focus on a long neglected subject, the sexual and reproductive behaviour of HIV-positive men in Kano, northern Nigeria. This study is also comparative, relating the sexual and reproductive behaviour of HIV-positive men with their pre-HIV state and their untested or HIV negative counterparts. The qualitative component of this mixed methods study provided nuanced descriptions of the behaviour reported during the survey. This is another first in the investigation of this subject in this part of Nigeria. Finally, interviews with health workers and managers complemented the perspectives of HIV-positive men, thereby including the health care provider account of the health care services.

The findings of this thesis contribute to the empirical literature and enhance understanding of the sexual and reproductive behaviour of HIV-positive men in Kano, northern Nigeria. This study uncovered the context and circumstances surrounding HIV testing among men, their immediate reactions to a positive test and how they struggled to come to terms with the new reality. It described felt stigma, disclosure and how all these factors influenced men's sexual and reproductive lives. Specifically, it assessed self-reported libido, sexual activity, coital frequency and condom use before and in response to HIV-positive status and its treatment. Furthermore, it ascertained their fertility desire, intention and their predictors. These behaviours were compared to their untested/HIV-negative contemporaries. These have not been done previously from this part of Nigeria.

Most importantly, this study tested the applicability of Crankshaw's conceptual framework in a Nigerian population that is culturally different from the South African population that originally informed the framework. While the original framework (Figure 2.3, p.41) (Crankshaw et al., 2012) explained the factors influencing sexual and reproductive behaviour of HIV-positive men in northern Nigeria to a large extent, the present study findings suggest the need to introduce additional factors to Crankshaw's framework. First, 'number of living children', 'employment status' and 'religion', important predictors of fertility intention among men in northern Nigeria, should be added to the individual male factors under 'Individual determinants'. Secondly, 'marital duration' which was also a significant predictor of fertility intention in the present study, should be included under 'couple level determinants'. Finally, to enhance the logic of Crankshaw's model, it is recommended that the outcome 'conception

for those who desire pregnancy' should swap position with 'reduced HIV transmission'. The recommended changes to Crankshaw's model are shown in bold under 'Individual determinants', 'Couple level determinants' and 'Desired outcomes' in Figure 9.1.

Figure 9.1: Recommended modifications to Crankshaw's conceptual model



Modified from: Crankshaw T, L., Matthews L, T., Giddy J et al., (2012). A conceptual framework for understanding HIV risk behaviour in the context of supporting fertility goals among HIV serodiscordant couples. *Reprod Health Matters*. *20*,39 Suppl, 50–60.

9.8 Recommendations

Based on the findings of this study, its strengths and limitations, the following recommendations are made for future research, policy and practice.

9.8.1 Future research

Follow up studies should track HIV-positive men's sexual and reproductive behaviour in the long term. Specifically, there is need to determine horizontal and vertical transmission rates among sero-concordant and sero-discordant couples in Kano, Nigeria. The findings should be disaggregated by type of marriage (monogamous and polygamous) and methods of safe conception. In addition, the present study should be replicated in other parts of Nigeria and other high burden countries in Africa, if possible using community based designs. Doing so

could inform comprehensive national and sub-regional SRH responses to the HIV/AIDS epidemic that is rooted in the local context.

It is important to study the attitude of health care workers and community members towards courtship, family formation and sexual and reproductive rights of HIV-positive men, as these factors could influence SRH counselling and service delivery. Periodic capacity needs-assessment should be conducted on safe sex, STI management, safe conception and family planning among health workers. This should inform subsequent training programs. In addition, an assessment of unmet contraceptive need of HIV-positive men and their partners should be conducted and interventions recommended for improving consistent condom use and family planning uptake should be evaluated. Finally, a study to disentangle the effects of HIV-positive diagnosis and ART on men's libido is needed.

9.8.2 Policy and practice

In view of the findings of this study, the following recommendations are made to the Federal health authorities, Health service providers and Communities:

Socio-cultural environment, policy and practice

- Create conducive social environment for safe sex behaviour change using a multisectoral mechanism involving relevant ministries (e.g. health, education, information, social welfare and culture)
- Update and expand the scope of SRH and HIV policy guidelines to address men and encourage their pro-active engagement during consultations
- Recruit and train relevant cadres of health care workers on STI prevention, case management and low-tech safe conception techniques
- Provide equipment and supplies for safe conception and effective prevention and management of STIs
- Use targeted communication to clear misconceptions about condoms and normalize their use among HIV-positive couples
- Community volunteers, traditional and religious leaders should use culturally acceptable channels (e.g. peer-to-peer and congregational sermons) to advocate for consistent condom use and family planning among men and their partners

Risk reduction strategies

Safe sex

- Men (and their partners) should be encouraged to take the HIV test, disclose to their partners and adopt safe sex practices (**A**bstinence, **B**eing faithful and **C**onsistent condom use)
- Encourage voluntary pre-marital counselling and testing for HIV with linkages to treatment for those found to be positive
- Sustain support groups and the match-making scheme for people living with HIV

Safe conception

- Health workers should encourage HIV-positive couples to plan their families, but allow couples to arrive at their decisions based on information on risks and available safe conception options
- The PMTCT knowledge-practice gap should be bridged by engaging men and making provisions for them at antenatal, delivery and postnatal clinics
- Health care workers should discourage HIV-positive couples from using unsafe methods of conception such as the 'condom piercing' method

Contraception

- HIV-positive couples who want to postpone or stop childbearing should have access to information and effective family planning services

9.9 Conclusion

In conclusion, this study provides evidence that in the era of ART, most men in Kano, Nigeria remained sexually active after HIV diagnosis but disliked condoms. Similarly, the majority desired fatherhood like their untested or HIV-negative contemporaries, and a substantial proportion planned to have a child within three years. However, the response of the health care services regarding safe sex and safe conception has been inadequate. In view of the potentially large number of women and children at risk of HIV infection, programs should develop effective interventions to address men's negative attitudes towards condoms. Such programs should be rights-based and particularly tackle the tensions between the need for consistent condom use as a protective strategy and the strong desire of couples to

procreate. Routine counselling of men and couples on SRH, enhanced negotiation skills and provision of low-tech safe conception methods in ART clinics could reassure couples that they can achieve both goals of a satisfying, safe sex life and having healthy children. Trained health workers and peers should consider the 'marital status', 'number of living children', 'employment status' and 'religion' among other factors in Crankshaw’s framework when counseling and providing up to date information to HIV-positive men and their partners to enable them make informed sexual and reproductive choices.

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Appendix 1 Participant information sheet

PHASE I INFORMATION SHEET (STUDY GROUP)

1. **Research Project Title:**

Sexual and reproductive behaviour of HIV-positive men and the response of the health care service: A mixed methods study in Kano, northern Nigeria

2. **Invitation paragraph**

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

3. **What is the project's purpose?**

The purpose of the research is to determine if testing positive to HIV affects sexual activities and childbearing desires in men. You will be asked about your sexual life before you tested positive for HIV and the changes that occurred after the test. Changes such as: 1) How frequent you engage in sexual intercourse? 2) How many wives (or sexual partners) you have and 3) Whether or not you use condoms during sexual intercourse? In addition, you will be asked if you are aware of ways of bearing children without infecting them. Other questions will include: How close is the nearest health facility that provides sexual and reproductive health services for men to where you live? How many times have you visited such facilities? The study is envisaged to last for 8 months, but you will be interviewed on a maximum of two occasions after your appointment visits to the S S Wali treatment centre.

4. **Why have I been chosen?**

You have been chosen (together with 269 others) through a scientifically random process which ensured that all persons receiving treatment at the SS Wali treatment centre have equal chance of participating in this study. The study did not consider your social, cultural, religious characteristics. But since some of these background characteristics may be related to sexual behaviour and childbearing, some of the questions may inquire about them. To ensure confidentiality, you are not going to be asked about your name.

5. **Do I have to take part?**

Please note that participation in this research is entirely voluntary. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw at any time without it affecting any treatments that you receive or benefits that you are entitled to in any way. You do not have to give a reason."

6. **What will happen to me if I take part?**

If you agree to take part in this study, you will be interviewed on a maximum of two occasions after your usual consultations with your doctor. The interviews will last approximately one hour each. You will be re-imbursed your travel cost (200 Naira) and provided with light refreshment during the interviews. If you are caught up in traffic or are unable to attend scheduled appointments, you only need to communicate with the lead researcher via text message or phone call (+2348035868293), so that we can re-schedule.

7. **What do I have to do?**

You don't need to make any special preparations for participation in this study.

8. **What are the possible disadvantages and risks of taking part?**

No known harm is associated with taking part in the study. You will however be required to sacrifice part of your time for answering questions during the interviews after the consultation. If you don't wish to answer any of the questions, you don't have to. All information provided by you cannot be traced to you.

9. **What are the possible benefits of taking part?**

Whilst there are no immediate benefits for those people participating in the research, it is hoped that this work will highlight the challenges that men face in their sexual and family lives if they are diagnosed HIV-positive. The tough choices they have to make regarding childbearing and how they struggle with it will also be better understood. In addition, whether or not they get the desired support from health care providers will also be ascertained.

10. **What happens if the research study stops earlier than expected?**

If the investigation is stopped for any reason, this will be explained to all the participants.

11. **What if something goes wrong?**

If you wish to raise a complaint about your encounter with the research assistants, you can contact (Prof. Zubairu Iliyasu on +234 8035868293 email ziliyasu@sheffield.ac.uk or ziliyasu@yahoo.com). If you are not satisfied or the complaint is against the lead investigator, please contact (Dr. Padam Simkhada on Tel +44 114 222 0752 email P.Simkhada@sheffield.ac.uk) or Dr. Jenny Owen Tel+ 44 114 222 0849 email j.m.owen@sheffield.ac.uk). Similarly, if you have any discomfort (physical or psychological) during or following the interviews report it immediately to (Prof. Zubairu Iliyasu on +2348035868293)

12. **Will my taking part in this research be kept confidential?**

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be identified in any reports or publications.

13. **What will happen to the results of the research project?**

At the end of the study, the thesis report will be submitted to the University of Sheffield. The study may be published in an academic journal, and presented at scientific forums and conferences without identifying participants, and without providing any information that will lead to their individual identification. The data collected during the course of the research might be used for additional or subsequent research.

14. **Who is organising and funding the research?**

This research is sponsored by Bayero University Kano as part of her staff capacity development efforts using McArthur PhD grants.

15. **Who has ethically reviewed the project?**

This project has been ethically approved by the Aminu Kano Teaching Hospital ethics review committee and the School of Health and Related Research (ScHARR) ethics review committee of the University of Sheffield.

16. **Will I be recorded, and how will the recorded media be used?**

The audio recordings of the interviews made during this research will be used only for analysis and illustrations. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. All identifiers will be removed in transcripts.

17. **Contact for further information**

For further information regarding this research work please contact Prof. Zubairu Iliyasu on Tel +234 8035868293 email ziliyasu@sheffield.ac.uk or ziliyasu@yahoo.com; Dr. Padam Simkhada on Tel +44 114 222 0752 email P.Simkhada@sheffield.ac.uk) or Dr. Jenny Owen Tel+ 44 114 222 0849 email j.m.owen@sheffield.ac.uk).

If you choose to participate, you will be given a copy of the information sheet and, a copy of the signed consent form to keep for your records.

Thank you for finding time to read this information sheet and considering participation in this research

Appendix 2 Consent form

Consent Form

Title of Research Project: Sexual and reproductive behaviour of HIV- positive men and the response of the health care service: A mixed methods study in Kano, northern Nigeria
Name of Researcher: Prof. Zubairu Iliyasu; School of Health and Related Research, The University of Sheffield & Department of Community Medicine, Bayero University/Aminu Kano Teaching Hospital, Kano, Nigeria Tel: +234 8035868293 E-mail: ziliyasu@sheffield.ac.uk & ziliyasu@yahoo.com

Participant Identification Number for this project:..... Please initial box

1. I confirm that I have read (or it has been read to me) and understand the information sheet phase I dated 1st February 2014 explaining the above research project and I have had the opportunity to ask questions about the project. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. [+234 8035868293]. ☐

3. I understand that my responses will be kept strictly confidential.
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. ☐

4. I agree for the data collected from me to be used in future research ☐

5. I agree to take part in the above research project. ☐

_____	_____	_____
Name of Participant (or legal representative)	Date	Signature/left thumb print
_____	_____	_____
Name of person taking consent (if different from lead researcher)	Date	Signature

Witness (required only for non-literate participants)

_____ _____ _____

Name of Witness Date Signature

To be signed and dated in presence of the participant

_____ _____

Lead Researcher Date Signature

To be signed and dated in presence of the participant

Copies:

Once this has been signed by all parties the participant will receive a copy of the signed and dated participant consent form and information sheet. A copy of the signed and dated consent form will be placed in the project's main record file kept under lock and key in a secure location.

Appendix 3 Questionnaire for HIV-positive men

SCHOOL OF HEALTH AND RELATED RESEARCH (ScHARR)
FACULTY OF MEDICINE, DENTISTRY AND HEALTH
THE UNIVERSITY OF SHEFFIELD
PhD Research Questionnaire (STUDY GROUP) Serial No.....

***Research Title*: Sexual and reproductive behaviour of HIV-positive men and the response of the health care service: A mixed methods study in Kano, northern Nigeria**

Date of interview..... Start time.....

Instruction: Encircle the correct response
SECTION A: **Socio-demographic data**

1. How old are you? _____ Date of birth (*if known*).....
   Age Group: [1] <20 [2] 20-24 [3] 25-29 [4] 30-34 [5] 35-39 [6] 40-44 [7] 45-49
   [8] 50-54 [9] 55-59 [10] 60-64 [11] 65-69 [12] 70-74 [13] 75-79 [14] ≥80
2. What is the highest level of education you have completed?
   [1] None [2] Qur'anic [3] Primary school [4] Secondary school [5] Tertiary [6] Postgraduate
   [7] Others (specify)……..
3. What is your religion? [1] Islam [2] Christianity [3] others (specify)_____
4. What is your ethnic group [1] Hausa [2] Fulani [3] Yoruba [4] Igbo [5] others (specify)
   _____
5. In which local government area (LGA) do you reside?.....
6. Are you employed? [1] Yes [2] No (*if No, Skip to Q 8.*)

   6b. If employed, what is your main occupation?.....

7. What is your average monthly income (in Naira)……

Marital life and children

8. What is your current marital status? [1] Single [2] Just living together (Co-habiting) [3]
   Married [4] Separated [5] Divorced [6] Widowed [*If single, skip to Q.15*]
9. *If married or cohabiting,*

a. How long have you been married/cohabiting?…….……
b. Indicate the type of marriage [1] monogamous [2] polygamous
c. *If polygamous* type, indicate the number of wives you have currently……..

10. Have you ever fathered any child? [1] Yes [2] No (*If No, skip to Q15*)
11. If yes, how many children have you fathered?.....

12. a. How many are alive?.....b. How many boys?…….....
    c. How many girls?…….
13. How old is your youngest child?.....
14. Have you fathered a HIV-positive child? [1] Yes [2] No

SECTION B: HIV DIAGNOSIS AND MANAGEMENT

15. How long ago did you test positive to HIV?.....
16. Have you been placed on ART drug treatment? [1] Yes [2] No (*If No, skip to Q19*)
17. *If on ART*, which drugs are you taking?.....
18. For how long have you been taking ART drugs?…….....

Health, stigma and optimism

Now I would like to read to you a group of statements. Please pick the statement that best describes the way you feel about life since testing positive to HIV

19. How would you consider your health in general? [1] Very good [2] Good [3] Fair [4] Bad [5] Very bad
20. Regarding feelings of *sadness*, will you say?
    [1] I don't feel sad at all [2] I feel sad frequently [3] I am sad all the time and I can't get out of it [4] I am so sad or unhappy that I can't stand it
21. With respect to *the future*, will you say?
    [1] I am not discouraged about the future [2] I feel discouraged about the future [3] I feel I have nothing to look forward to [4] I feel that the future is hopeless and things cannot improve
22. Regarding your *sleep pattern*, will you say?
    [1] I sleep as well as usual [2] I don't sleep as well as I used to [3] I wake up 1-2 hrs earlier than usual and find it hard to get back to sleep [4] I wake up more than 2 hrs earlier than usual and I find it hard to get back to sleep
23. How strongly do you agree or disagree with the statement 'With proper management, HIV-positive persons *can live a normal life*' [1] Strongly agree [2] Agree [3] Undecided [4] Disagree [5] Strongly disagree
24. How strongly do you agree or disagree with the statement 'I am *discriminated* against because of my HIV-positive status' [1] Strongly agree [2] Agree [3] Undecided [4] Disagree [5] Strongly disagree

Knowledge of HIV transmission

25. What is the chance that the spouse/sexual partner of a HIV-positive man can get infected with HIV, if he doesn't use condoms? [1] Very high chance [2] high chance [3] Not sure [4] low chance [5] very low chance
26. Is this chance [1] lower [2] higher or [3] the same, if the man is on ART treatment?
27. Is this chance [1] lower [2] higher or [3] the same, if the woman is on Pre-Exposure prophylaxis (PrEP)?

SECTION C: SEXUAL BEHAVIOUR

Knowledge of safe sex

28. Can a HIV-positive man have sexual intercourse without transmitting the virus to the sex partner? [1] Yes [2] No [3] Don't know (*If No or don't know skip to Q30*)
29. *If yes,* mention the ways in which a HIV-positive man can protect his sexual partner from getting infected during intercourse

.....

Sexual activity

30. How will you rate your sexual interest/libido ***before*** testing positive to HIV? [1] Very high [2] high [3] average [4] low [5] very low
31. How will you rate your sexual interest/libido ***after*** testing positive to HIV? [1] Very high [2] high [3] average [4] low [5] very low
32. *If on ART,* how will you compare your ***sexual interest/desire*** *before* and *after* commencing ART? [1] No change [2] lower after starting ART [3] Higher after starting ART
33. *Before testing positive to HIV,* have you ever engaged in [1] vaginal sexual intercourse YES/NO [2] oral sex YES/NO [3] anal sex YES/NO?

    b. Do you have sexual intercourse with [1] women only [2] men only [3] both men and women
34. How ***frequent*** did you have sexual intercourse *before* you tested positive to HIV?.....
35. Have you had sexual intercourse since testing positive to HIV? [1] Yes [2] No (*If no skip to Q38*)
36. *If yes,* when was the ***last time*** you had sexual intercourse?.....
37. How ***frequent*** do you have sexual intercourse ***after*** you tested positive to HIV?.....

38. How will you rate your ***sexual performance*** *before* you tested positive to HIV?
[1] Very good [2] good [3] average [4] poor [5] very poor [6] Not applicable

39. How will you rate your ***sexual performance*** *after* testing positive to HIV?
[1] Very good [2] good [3] average [4] poor [5] very poor [6] Not applicable

40. *If on ART,* How will you compare your ***sexual performance*** *before* and *after* starting ART treatment?
[1] No change [2] worse after starting ART [3] better after starting ART [4] Not applicable

41. How ***satisfied*** are you with your sexual life *now*? [1] very satisfied [2] satisfied [3] fair [4] little [5] not satisfied [6] Not applicable

42. *If unmarried,* do you have a regular sex partner(s)? [1] Yes [2] No

43. Have you ever used (male) condoms? [1] Yes [2] No (*If No, Skip to Q48*)

44. If yes, when was the last time you used (male) condoms?.....

45. Did you use condoms during your last sexual intercourse? [1] Yes [2] No [3] Not applicable

46. Do you use condoms when having sexual intercourse with your spouse(s) [1] Yes [2] No [3] Not applicable

47. How frequent do you use condoms? [1] always [2] occasionally [3] never?

48. *If sexually active and not using condoms always*, what are the reason(s).....
.....

49. In the last 6 months, how many sexual partners have you had? [1] none [2] one [3] two [4] three [5] four [6] more than four (specify number).....

50. Apart from your spouse (s), do you have other sex partners?
[1] Yes [2] No [3] Not applicable (*If No, Skip to Q52*)

51a. *If yes,* do you use condoms with other sexual partners (*apart from spouse*)? [1] Yes [2] No

51b. Does your partner(s) have other sexual partners (other than you)? [1] Yes [2] No [3] don't know

52. Have you had symptoms of sexually transmitted infection (STI) since testing positive to HIV? [1] Yes [2] No

53. Do you know the HIV status of your spouse/sexual partner (s)? [1] Yes [2] No

54. *If in a monogamous marriage or relationship*, what is the HIV status of your spouse/sexual partner? [1] HIV-positive [2] HIV-negative [3] HIV status unknown

55. *If in a polygamous marriage or having multiple sex partners*, indicate the HIV status of

your wives/partners: (1) 1st wife/1st partner ..... (2) 2nd wife/2nd partner.....
(3) 3rd wife/3rd partner .....(4) 4th wife/4th partner .....(5) Others (specify).....

56. Have you disclosed your HIV status to your spouse (s)/sexual partner(s)?
[1] Yes, to all of them [2] Yes, to some of them [3] No [3] Not applicable

SECTION D: REPRODUCTIVE BEHAVIOUR

Reproductive history and decision-making

57. *If married,* have you ever discussed about the number of children you wish to have with your spouse? [1] Yes [2] No (*If No, Skip to Q59*)
58. *We know that children are from God*: In your family, who makes the final decision regarding the number of children you ***plan*** to have? [1] Myself alone [2] My wife alone [3] My wife and I [3] Our parents [4] We leave it to God [5] Others (please specify).....
59. Did you have a child/children before you tested positive to HIV? [1] Yes [2] No (*If No, Skip to Q61*)
60. How many children did you have ***before*** testing positive to HIV?.....
How many boys.....? How many girls.....?

Knowledge and practice of safe conception

61. Is it possible for a man who tests positive to HIV to impregnate his wife without getting her infected with HIV? [1] Yes [2] No [3] Don't know (*If No or don't know skip to Q63)*
62. *If yes* to Q 61, list the ways in which a HIV-positive man can impregnate his wife without infecting her with HIV
1).....
2)……..
3)……..
(***first ask without prompting***)
63. Have you ever heard of the following safe conception methods?
[1] Manual insemination at home YES/NO [2] Artificial insemination in hospital YES/NO [3]Sperm washing YES/NO [3] Timed intercourse at peak fertility period YES/NO [4] Pre-exposure ART prophylaxis YES/NO [5] ART drug treatment YES/NO
64. Have you ever been told about any of these methods of safe conception in the clinic?
[1] Yes [2] No (*If No, skip to Q66*)
65. *If yes,* which one(s) have you been told about?.....
66. *If married,* Do you practice any of these methods of safe conception? [1] Yes [2] No (*If no, skip to Q68*)

67. *If yes*, which one(s) do you practice? [1] Manual insemination at home YES/NO [2] Artificial insemination in hospital [3]Sperm washing YES/NO [3] Timed intercourse at peak fertility period YES/NO [4] Pre-exposure ART prophylaxis YES/NO [5] ART drug treatment YES/NO
68. Is it possible for a man who has tested HIV-positive to father a child who is HIV-negative? [1] Yes [2] No [3] Don't know (*If No or don't know skip to Q70*)
69. *If yes* to Q.68, list the ways in which a HIV-positive man can father a HIV-negative child

1)……
2)……
3)……
4)……
5)……

(***ask without prompting***)

70. Have you ever heard of prevention of mother to child transmission (PMTCT)? YES/NO
71. *If yes*, what is your source of information about PMTCT?.....
72. *If yes*, have you ever participated in a PMTCT program? YES/NO

Desire and intention to have children

73. Do you wish to have any/more children? (1) Yes (2) No (*If No, skip to Q78*)
74. How many children ***in total*** do you wish to have?.....children
75. If you were to choose, will you prefer to have more boys or more girls? (1) More boys (2) More girls (3) No preference (*If No preference, Skip to Q78*)
76. *If respondent had a preference* in Q. 75, how many more boys.....? How many more girls..... do you wish to have?
77. For those with sex preference, what is your reason for this preference?.....

.....

78. Has there been a change in the ***total number*** of children you wish to have ***after*** testing positive to HIV? [1] Yes [2] No (*If No, Skip to Q 80*)
79. *If yes* to Q78, how has it changed? [1] I want more children now [2] I want less children now [3] I want more boys now [4] I want more girls now [5] Others (specify).....
80. Does your partner/spouse want to have more children? [1] Yes [2] No [3] I don't know
81. Do you intend to have a/another child during the next three years? [1] definitely not [2] probably not [3] probably yes [4] definitely yes
82. Are you or your spouse doing anything to help her get pregnant? [1] Yes [2] No

(*If No, skip to Q85*)

83. *If yes* to Q82, specify what you or your spouse is doing.....

(*Probe specifically for the following*)

1 – receiving medication (1) Yes (2) No

2 – methods for ascertaining timing of ovulation (1) Yes (2) No

3 – in vitro fertilisation (IVF) or micro-fertilisation (ICSI) (1) Yes (2) No

4 – surgery (1) Yes (2) No

5 – artificial insemination (1) Yes (2) No

6 - Sperm washing (1) Yes (2) No

7 – others (specify).....

84. *If yes* to Q82, how long ago did you or your spouse start doing something to help her get pregnant?.....

85. Did your wife/wives become pregnant ***after*** you have tested positive to HIV?

[1] Yes [2] No [3] Not applicable

86. Is your wife/any of your wives ***currently*** pregnant? [1] Yes [2] No

Contraceptive knowledge and use

87. Are contraceptives safe for HIV-positive people? [1] Yes [2] No [3] Don't know

88. Is there a chance that drugs used for treating HIV infection can affect those used for contraception? [1] Yes [2] No [3] don't know

89. *If married*: Are you or your spouse using or doing anything to prevent pregnancy?

(1) Yes (2) No (3) Don't know (*If No or don't know, skip to Q93*)

90. *If yes,* which method are you using?.....

91. Which method is your wife using?.....

Probe specifically for the use of the following by the couple

1 – condom (1) Yes (2) No

2 – pills (1) Yes (2) No

3 – intra-uterine device (coil, loop) (1) Yes (2) No

4 – diaphragm/ cervical cap (1) Yes (2) No

5 – foam/ cream/ jelly/ suppository (1) Yes (2) No

6 – injectables (e.g. Depo-Provera) (1) Yes (2) No

7 – implants (e.g. Norplant) (1) Yes (2) No

8 – emergency contraception (1) Yes (2) No

9 – withdrawal method (1) Yes (2) No

10 – safe period method (rhythm) (1) Yes (2) No

11- Male Sterilization (1) Yes (2) No

12-Bilateral tubal ligation (BTL) (1) Yes (2) No

13. Others (specify).....

92. *If using any method*, how long ago did you start using it to prevent pregnancy?

.....

RESPONSE OF HEALTH CARE SERVICE

93. Have you been provided with information regarding safe sex in your clinic?

[1]Yes [2] No

94. Have you been provided with information regarding safe conception? [1] Yes [2] No

95. Have you been counselled on consistent condom use? [1] Yes [2] No

96. Have you been screened for STIs in the clinic? [1] Yes [2] No

97. Have you been screened for prostate cancer in the clinic? [1] Yes [2] No

98. Do you know where to seek for treatment if you have symptoms of STI?

[1] Yes [2] No

99. Have you been counselled on the prevention of mother to child transmission of HIV?

[1] Yes [2] No

100. Have you talked to your provider, nurse or counsellor about your options for safe conception? [1] Yes [2] No

101. Has anyone at this clinic ever spoken to you about family planning?
[1]Yes [2] No

102. Have you ever been told by a health care worker that your spouse should not become pregnant because of your HIV status?" [1] Yes [2] No

103. Do you have a GSM phone? [1] Yes [2] No

104. Measure respondent's current weight……. and Height……

BMI=……

105. Classify the respondent based on Body Mass Index (BMI) obtained in Q 104.

[1] underweight [2] normal [3] overweight [4] obese

..... End time.....

THANK YOU FOR YOUR TIME AND PATIENCE

EXTRACT FROM RESPONDENT'S MEDICAL RECORDS [HOSP NO.....]

106. Obtain respondent's baseline CD4 count from medical records.....

107. Obtain respondent's current CD4 count from medical records.....

108. Indicate the WHO staging of respondent at baseline.....

109. Obtain respondent's current WHO staging.....

Appendix 4 Questionnaire for Control group

SCHOOL OF HEALTH AND RELATED RESEARCH (ScHARR)
FACULTY OF MEDICINE, DENTISTRY AND HEALTH
THE UNIVERSITY OF SHEFFIELD
PhD Research Questionnaire (CONTROL GROUP) Serial No.....

***Research Title*: Sexual and reproductive behaviour of HIV-positive men and the response of the health care service: A mixed methods study in Kano, northern Nigeria**

Date of interview..... Start time.....

Instruction: Encircle the correct response

SECTION A: **Socio-demographic data**
1. How old are you? _____ Date of birth (*if known*).....

2. What is the highest level of education you have successfully completed?

[1] None [2] Qur'anic [3] Primary school [4] Secondary school [5] Tertiary [6] Postgraduate

[7] Others (specify)……..

3. What is your religion? [1] Islam [2] Christianity [3] others (specify)_____

4. What is your ethnic group [1] Hausa [2] Fulani [3] Yoruba [4] Igbo [5] others (specify)

_____

5. Indicate the LGA where you live.....5b. Your state of origin.....

6. *If employed*, what is your main occupation? ..... (*if unemployed skip to Q 8.*)

7. What is your average monthly income (in Naira)……

Marital life and children

8. What is your current marital status? [1] Single [2] Married [3] Separated [4] Divorced [5] Widowed [*If single skip to Q.14*]

If married, indicate:

9. How long you have been married…….……

10. Type of marriage [1] monogamous [2] polygamous

If polygamous, indicate the number of wives……..

11. Have you ever fathered any child? [1] Yes [2] No

12. If yes, how many children have you fathered?.....

a. How many are alive?.....b. How many boys?…….....

c. How many girls?…….

13. How old is your last child?.....

Knowledge of HIV transmission

14. What is the chance that the spouse/sexual partner of a HIV-positive man can get HIV, if he doesn't use condoms? [1] Very high chance [2] high chance [3] Not sure [4] low chance [5] very low chance

15. Is this chance lower, higher or the same, if the man is on ART treatment? [1] lower [2] higher [3] the same [4] don't know

16. Is this chance lower, higher or the same, if the woman is on Pre-Exposure prophylaxis (PrEP)? [1] lower [2] higher [3] the same [4] don't know

SECTION C: SEXUAL BEHAVIOUR

Knowledge of safe sex

17. Can a HIV-positive man have sexual intercourse without transmitting the virus to the sex partner? [1] Yes [2] No [3] don't know

18. *If yes,* mention the ways in which a HIV-positive man can protect his sexual partner from getting infected during intercourse

.....

Sexual activity

19. How will you rate your sexual interest/libido?
[1] Very high [2] high [3] average [4] low [5] very low

20. Have you ever engaged in [1] vaginal sexual intercourse YES/NO [2] oral sex YES/NO [3] anal sex YES/NO? (If 'NO' to all skip to Q41)

21. What is the gender of your sexual partners? Male [ ] Female [ ] Both [ ]

22. How frequent do you have sexual intercourse?.....

23. How will you rate your sexual performance?
[1] Very good [2] good [3] average [4] poor [5] very poor [6] Not applicable

24. How satisfied are you with your sexual life? [1] very satisfied [2] satisfied [3] fair [4] little [5] not satisfied [6] Not applicable

25. Do you have a regular sex partner(s)? [1] Yes [2] No

26. Have you ever used (male) condoms? [1] Yes [2] No (If No, skip to Q31)

27. If yes, when was the last time you used (male) condoms?.....

28. Did you use condoms during your last sexual intercourse? [1] Yes [2] No [3] Not

applicable

29. Do you use condoms with spouse(s) [1] Yes [2] No [3] Not applicable
30. How frequent do you use condoms? [1] always [2] occasionally [3] never?
31. In the last 6 months, how many sexual partners have you had? [1] none [2] one [3] two [4] three [5] four [6] more than four (specify number).....
32. Apart from your spouse (s), do you have other sex partners [1] Yes [2] No [3] Not applicable
33. *If yes*, do you use condoms with other sexual partners (*apart from spouse*)? [1] Yes [2] No
34. Does your partner(s) have other partners other than you? [1] Yes [2] No [3] don't know
35. Have you had symptoms of sexually transmitted infection (STI) recently? [1] Yes [2] No
36. Do you know the HIV status of your sexual partner (s)? [1] Yes [2] No
37. *If in a monogamous marriage or relationship*, what is the HIV status of your spouse/sexual partner? [1] HIV positive [2] HIV negative [3] HIV status unknown
38. *If in a polygamous marriage or having multiple sex partners*, indicate the HIV status of the wives/partners: (1) 1st wife/1st partner ..... (2) 2nd wife/2nd partner.....(3) 3rd wife/3rd partner .....(4) 4th wife/4th partner .....(5) Others (specify).....

SECTION D: REPRODUCTIVE BEHAVIOUR

Reproductive history and decision-making

39. *If married*, have you ever discussed the number of children you wish to have with your spouse? [1] Yes [2] No
40. *We know that children are from God*: In your family, who makes the final decision regarding the number of children you ***plan*** to have? [1] Myself alone [2] My wife alone [3] My wife and I [3] Our parents [4] Others (please specify).....

Knowledge and practice of safe conception

41. Is it possible for a man who tests positive to HIV to impregnate his wife without getting her infected with HIV? [1] Yes [2] No [3] Don't know
42. *If yes* to Q 61, list the ways in which a HIV-positive man can impregnate his wife without infecting her with HIV

1).....

2)……..

3)……..

43. Is it possible for a man who has tested HIV-positive to father a child who is HIV-negative? [1] Yes [2] No [3] Don't know

44. *If yes* to Q .70, list the ways in which a HIV-positive man can father a HIV-negative child

1)……

2)……

3)……

4)……

5)……

45. Have you ever heard of prevention of mother to child transmission (PMTCT)? YES/NO

46. *If yes,* what is your source of information about PMTCT?.....

Desire and intention to have children

47. Do you wish to have any/more children? (1) Yes (2) No

48. How many (more) children in total do you wish to have?.....children

49. If you were to choose, will you prefer to have more boys or more girls? (1) More boys (2) More girls (3) No preference

50. *If respondent had a preference* in Q. 77, how many more boys.....? How many more girls..... do you wish to have?

51. For those with preference, what is your reason for this preference.....

.....

52. Does your partner/spouse want to have (more) children? [1] Yes [2] No [3] I don't know

53. Do you intend to have a/another child during the next three years? [1] definitely not [2] probably not [3] probably yes [4] definitely yes

54. Are you or your spouse doing anything to help her get pregnant? [1] Yes [2] No

55. *If yes*, specify what you or your partner is doing.....

(*Probe specifically for the following*)

1 – receiving medication (1) Yes (2) No

2 – methods for ascertaining timing of ovulation (1) Yes (2) No

3 – in vitro fertilisation (IVF) or micro-fertilisation (ICSI) (1) Yes (2) No

4 – surgery (1) Yes (2) No

5 – artificial insemination (1) Yes (2) No

6 - Sperm washing (1) Yes (2) No

7 – others (specify).....

56. *If yes* to Q 80, how long ago did you start doing something to help your spouse get pregnant?.....

57. Is your wife/any of your wives currently pregnant? [1] Yes [2] No

Contraceptive and use

58. *If married*: Are you or your spouse using or doing anything to prevent pregnancy?

(1) Yes (2) No (3) Not Applicable

59. If yes, which method are you using?.....

60. Which method is your wife using?.....

Probe specifically for the use of the following by the couple

1 – condom (1) Yes (2) No

2 – pills (1) Yes (2) No

3 – intra-uterine device (coil, loop) (1) Yes (2) No

4 – diaphragm/ cervical cap (1) Yes (2) No

5 – foam/ cream/ jelly/ suppository (1) Yes (2) No

6 – injectables (e.g. Depo-Provera) (1) Yes (2) No

7 – implants (e.g. Norplant) (1) Yes (2) No

8 – emergency contraception (1) Yes (2) No

9 – withdrawal method (1) Yes (2) No

10 – safe period method (rhythm) (1) Yes (2) No

11- Male Sterilization (1) Yes (2) No

12-Bilateral tubal ligation (BTL) (1) Yes (2) No

13. Others (specify).....

61. *If using any method*, how long ago did you start using it to prevent pregnancy?

.....

RESPONSE OF HEALTH CARE SERVICE

62. Have you been provided with information regarding Safe sex and conception in your clinic?[1]Yes[2] No
63. Have you been counselled regarding safe sex? [1] Yes [2] No
64. Have you been counselled on condom use? [1] Yes [2] No
65. Have you been screened for STIs in the clinic? [1] Yes [2] No
66. Have you been screened for prostate cancer in the clinic? [1] Yes [2] No
67. Have you been screened for testicular cancer? [1] Yes [2] No
68. Do you know where to seek for treatment if you have symptoms of STI?
    [1] Yes [2] No
69. Have you ever talked to your provider, nurse or counsellor about sexual problems?
    [1] Yes [2] No
70. Has anyone ever spoken to you about family planning?
    [1]Yes [2] No
71. Measure respondent's current weight……. and Height……
    BMI=……
72. Classify the respondent based on Body Mass Index (BMI) obtained in Q 71.
    [1] underweight [2] normal [3] overweight [4] obese

End time.....

THANK YOU FOR YOUR TIME AND PATIENCE

Appendix 5 Interview guide for HIV-positive men

SCHOOL OF HEALTH AND RELATED RESEARCH (ScHARR)
FACULTY OF MEDICINE, DENTISTRY AND HEALTH
THE UNIVERSITY OF SHEFFIELD
PhD INDEPTH INTERVIEW GUIDE

***Research Title*: Sexual and reproductive behaviour of HIV-positive men and response of the health care service: A mixed methods study in Kano, northern Nigeria**

I'm interested in discussing how being HIV positive has affected your sexual and reproductive life and the support you get from the health care providers regarding sexual and reproductive problems.

How far back was it when you realized that you were HIV positive?

How did you come to know that you were HIV positive?

Sexual behaviour change following HIV diagnosis and risk behaviour
I am interested in knowing whether being HIV positive has changed the way you relate sexually with the opposite sex (girl friends, wife/wives, extra-marital)

Have you had sexual intercourse recently? Say in the past 6 months?
If no, What is the reason why you have not had sex in the past 6 months?
What would say made you stop engaging in sex?

and if so, *how* has it changed (probe for sexual interest-libido, number of partners, frequency, types of sexual activity), has it affected how careful you are in engaging sexually with others (need to know partner serostatus, multiple sex partners-marital and extramarital, condom use)

Knowledge and practice of safer sex
Probe for understanding of transmission risks (for sero-discordant, sero-concordant partners) and how one can minimise those (does he take these steps?)

Reasons for change in sexual behaviour and risk taking

and if there has been a change, *why* the change?

Reproductive decision making. Reasons for and deterrents to having children. Role of men/women in pregnancy decisions and the spectrum of pregnancy planning.

Secondly, We shall be discussing whether or not you *want* to have children in future? (inquire about respondent's existing children, any HIV positive children?) Has this desire (or lack of it) changed since you became aware of your HIV status?

If it has changed, *why* has it changed? Probe: (why do you want to have children or why don't you want to have children in the future?)

Who and who are involved in the decision making process? (do you discuss such issues with your wife/wives? Or partners?) Do you *consciously plan* for when and how many children to have?

Peri-conception risk understanding and practices. Safer sex strategies to protect partner and prevent vertical transmission to the baby

Are you *aware* of the risks involved in childbearing when one or both parents is HIV positive? Do you know of ways how these risks can be reduced? (i.e., the deliberate processes that should be used to achieve safe pregnancy).

Have you taken any steps in realising your child bearing wishes?

Have you discussed issues regarding sexual life and child bearing with your health care provider? (probe, who initiated, how receptive, attitude of the health care workers, what was discussed and what was their advice?

Discuss, respondent's perception of family, friends and community attitude and support for childbearing among HIV positive persons

Post-conception HIV risk reduction to protect the unborn child.
Are you aware of any steps to be taken to prevent the transmission of HIV to an unborn baby? During delivery and thereafter?

Response of the health care service

Do you know of sexually transmitted infections that affect men? Where do they seek treatment for these symptoms?

If one presents with this symptoms to this hospital, where can he be treated? How easy is it to see a health provider if one comes with these problems?

During your visits to S S Wali centre, apart from receiving treatment, have you ever discussed sexual or reproductive problems with your health care provider? Who initiated such a discussion?

Have you been counselled regarding safe sex practices (condom use, avoidance of multiple sex partners, knowing your partner's serostatus etc.)

From your point of view, do health care providers at this centre support childbearing among HIV positive people?

Have you been counselled on safe conception methods?

Are you aware of existence of services that will reduce risk of transmission of HIV to partner, unborn child and infants?

Conclusions

Is there anything you would want to discuss that has not been covered?

THANK YOU FOR YOUR TIME

Appendix 6 Interview guide for Health care workers/managers

SCHOOL OF HEALTH AND RELATED RESEARCH (ScHARR)
FACULTY OF MEDICINE, DENTISTRY AND HEALTH
THE UNIVERSITY OF SHEFFIELD
PhD Research (INDEPTH INTERVIEW GUIDE) (HEALTH CARE PROVIDERS/MANAGERS)
***Research Title*: Sexual and reproductive behaviour of HIV-positive men and the response of the health care service: A mixed methods study in Kano, northern Nigeria**
Key informant interview guide with health care workers/managers.

Date of interview (DD/MM/YY):__ __/ __ __ / __ __

Professional category of respondent (e.g. nurse, Doctor, Health Manager):
……
Role in HIV/ART programme……

Introduction and consent
Thank you so much for meeting with me today. My name is **[Name]**. I am a PhD student at the School of Health and Related Research, University of Sheffield. I am conducting a study to gain a better understanding of the problems PLWHA and their healthcare workers face and share with policy-makers and encourage them to make proper decisions that will assist PLWHA and their health care workers. We are conducting a study to learn more about sexual and reproductive behaviour of HIV-positive men and the response of the health care service in Kano, northern Nigeria. You were selected to participate in this interview because in your capacity as a **[Job Title]**, you deal directly with PLWHA who may or may not be on ART treatment. We hope that you will participate in this study because your views are very important. The interview should take about an hour. I will be taping the session because I don't want to miss any of your comments. All your responses will be kept confidential and will not be shared with anyone else outside our research team. We will ensure that any information we include in our report does not identify you as a respondent. Remember you don't have to talk about anything you don't want to. If at any point you would like to stop, or if there are any questions you would rather not answer, just let me know.

Tasks, training and skills
Interviewer: I would like to start by asking you about the work that you do.

1. Briefly describe your role and responsibilities in the HIV/AIDS or ART Programme

2. What specific training have you received for this job in relation to HIV/ ART programme? Tell me about the training details

3. Do you think this training has been sufficient?

4. Can you tell me about the staff mix in your health facility that have been trained to deal with PLWHA? (***probe: how many and what kind of training they received***)

ART Treatment and service integration
Interviewer: Now I would like to ask you about ART use by PLWHA

5. Which treatment guidelines for HIV/AIDS management do you use in this facility? (Give details if necessary, e.g. national guidelines)

6. Do you have a policy on HIV/AIDS and SRH service integration? (***Probe for National policy document on HIV/AIDS/SRH service integration, facility level document outlining how these services are to be integrated***)

Sexual and reproductive issues

7. What issues are covered when counselling HIV-positive men? (***Probe: Does it involve sexual and reproduction matters?)***

8. What do you advise HIV-positive men as far sex and reproduction is concerned?

9. What is your personal view concerning HIV-positive men engaging in sexual relations or having children? Please explain your answer

10. Does your health facility offer STI prevention, safe sex counselling and STI treatment services for HIV-positive men?

If yes, does your facility integrate HIV/AIDS services with STI treatment or are these services offered in different clinics?

11. Does your health facility offer safe conception services (sperm washing, artificial insemination, pre-exposure prophylaxis etc) for HIV positive couples?

If yes, does your facility integrate HIV/AIDS services with safe conception services or are these services offered in different clinics?

12. Does your health facility offer family planning services to men? If so what sort of family planning services do they offer? Specifically which methods are available for men?

If yes, does your facility integrate HIV/AIDS services with family planning or are these services offered in different clinics?

13. If HIV/AIDS treatment and support services are NOT integrated with safe sex, safe conception and family planning services, WHY?

14. How equipped do you feel you/your organization is to handle the sexual and reproductive health needs of PLWHA, especially HIV-positive men? ***(Probe for skilled personnel composition and training of service providers], existence of necessary infrastructure, review of training needs and other resources?)***

15. What do you see as the barriers to the effectiveness of family planning programs and contraceptive use by HIV-positive men?

16. What have you/other staff found most challenging about working with HIV positive men

17. Last question -- when it comes to sexual and reproductive health services for HIV-positive men, what would you like to see happen, if you had all the decision-making power? ***(Probes: What would you focus on first? How would you implement that?)***

Interview Closing:

Thank you so much for your time. This has been very interesting and I've certainly learned a lot more about your experiences and sexual and reproductive health needs of HIV- positive

Appendix 7 Approval by Aminu Kano Teaching Hospital Ethics Committee

AMINU KANO TEACHING HOSPITAL
P. M. B. 3452, ZARIA ROAD, KANO.
(☎: 07068297399, 08057203511, 064 - 377085 - 8) www.akth.org, E-mail: enquiries@akth.org, email: (akthkano@yahoo.com)

CHIEF MEDICAL DIRECTOR
PROFESSOR A. Z. MOHAMMED, MBBS, FMCPath

CHAIRMAN M. A. C.
DR. HADIZA S. GALADANCI, MBBS, FWACS, FICS, MRCOG

DIRECTOR OF ADMINISTRATION
ALH. MUHD. SULAIMAN, B. Ed, CHPM, AIHAN

Our Ref: AKTH/ETHICS/Vol.IX/674

18th December 2013

Prof. Zubairu Iliyasu
School of Health and Related Research
University of Sheffield,
United Kingdom

Re: *Ethical Clearance for the study titled* 'Sexual and reproductive behaviour of HIV-positive men and the response of the health system: A mixed methods study in Kano, northern Nigeria'

Dear Prof. Iliyasu

The Ethics committee of Aminu Kano Teaching Hospital has deliberated on your proposed study in caption at its sitting on the 18th on December 2013. The members were satisfied with the study objectives, information as provided in the participant's information sheet and the proposed informed consent process. The committee hereby grants ethical approval for the conduct of the study.

You are expected to provide us with periodic progress reports and a copy of the final study report for our records.

Yours sincerely,

Mrs Bara'atu Aliyu
Committee secretary

Appendix 8 Approval by ScHARR ethics committee, University of Sheffield

The University Of Sheffield.

Kirsty Woodhead
Ethics Committee Administrator

Regent Court
30 Regent Street
Sheffield S1 4DA
Telephone: +44 (0) 114 2225453
Fax: +44 (0) 114 272 4095 (non confidential)
Email: k.woodhead@sheffield.ac.uk

Our ref: 0701/KW

3 February 2014

Zubairu Iliyasu
ScHARR

Dear Zubairu

Sexual and reproductive behaviour of HIV-positive men and the response of the health system: A mixed methods study in Kano, northern Nigeria.

Thank you for submitting the above research project for approval by the ScHARR Research Ethics Committee. On behalf of the University Chair of Ethics who reviewed your project, I am pleased to inform you that on 03 February 2014 the project was approved on ethics grounds, on the basis that you will adhere to the documents that you submitted for ethics review.

The research must be conducted within the requirements of the hosting/employing organisation or the organisation where the research is being undertaken. You are also required to ensure that you meet any research ethics and governance requirements in the country in which you are researching. It is your responsibility to find out what these are.

If during the course of the project you need to deviate significantly from the documents you submitted for review, please inform me since written approval will be required. Please also inform me should you decide to terminate the project prematurely.

Yours sincerely

Kirsty Woodhead
Ethics Committee Administrator

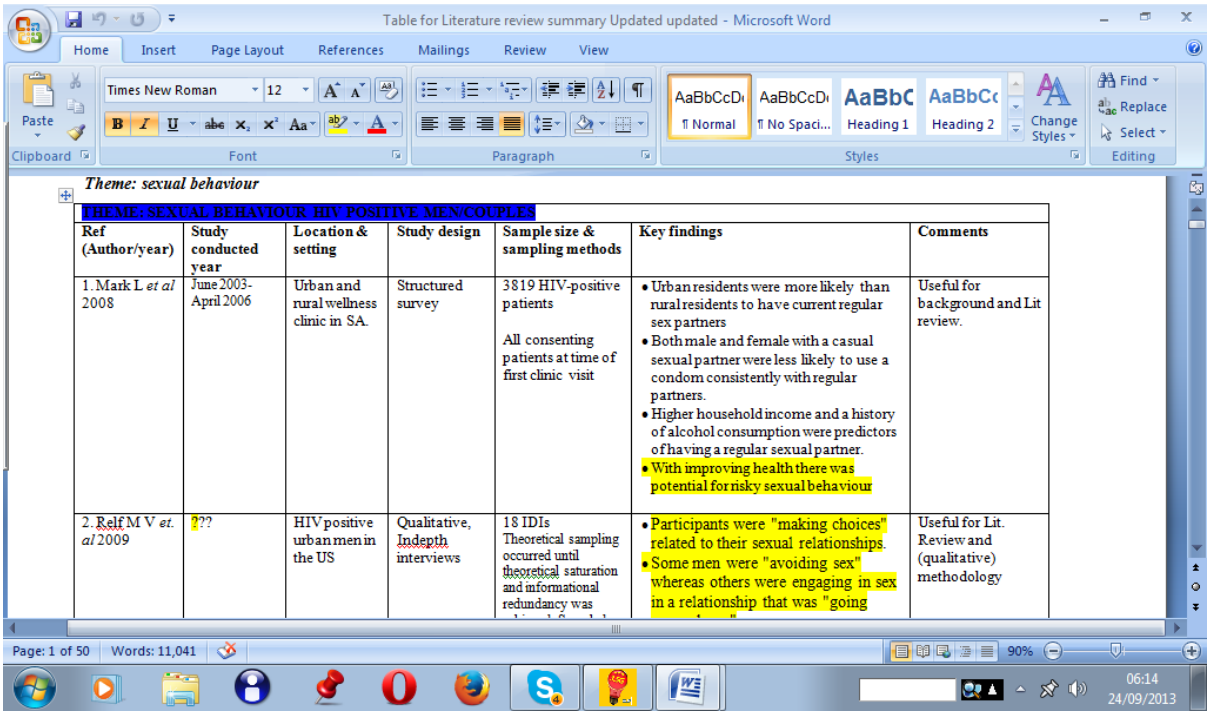
Appendix 9 WHO HIV/AIDS Clinical Staging

Clinical stage	Clinical conditions and symptoms
Stage 1	Asymptomatic Persistent generalized lymphadenopathy
Stage 2	Moderate unexplained weight loss (<10% of presumed or measured body weight) Recurrent respiratory infections (sinusitis, tonsillitis, otitis media, and pharyngitis) Herpes zoster Angular cheilitis Recurrent oral ulceration Papular pruritic eruptions Seborrheic dermatitis Fungal nail infections
Stage 3	Unexplained severe weight loss (>10% of presumed or measured body weight) Unexplained chronic diarrhea for >1 month Unexplained persistent fever for >1 month (>37.6°C, intermittent or constant) Persistent oral candidiasis (thrush) Oral hairy leukoplakia Pulmonary tuberculosis (current) Severe presumed bacterial infections (e.g., pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteraemia) Acute necrotizing ulcerative stomatitis, gingivitis, or periodontitis Unexplained anemia (hemoglobin <8 g/dL) Neutropenia (neutrophils <500 cells/µL) Chronic thrombocytopenia (platelets <50,000 cells/µL)
Stage 4	HIV wasting syndrome, as defined by the CDC (see Table 1, above) *Pneumocystis* pneumonia Recurrent severe bacterial pneumonia Chronic herpes simplex infection (orolabial, genital, or anorectal site for >1 month or visceral herpes at any site) Esophageal candidiasis (or candidiasis of trachea, bronchi, or lungs) Extrapulmonary tuberculosis Kaposi sarcoma Cytomegalovirus infection (retinitis or infection of other organs) Central nervous system toxoplasmosis HIV encephalopathy Cryptococcosis, extrapulmonary (including meningitis) Disseminated nontuberculosis mycobacteria infection Progressive multifocal leukoencephalopathy

	Candida of the trachea, bronchi, or lungs Chronic cryptosporidiosis (with diarrhea) Chronic isosporiasis Disseminated mycosis (e.g., histoplasmosis, coccidioidomycosis, penicilliosis) Recurrent nontyphoidal *Salmonella* bacteremia Lymphoma (cerebral or B-cell non-Hodgkin) Invasive cervical carcinoma Atypical disseminated leishmaniasis Symptomatic HIV-associated nephropathy Symptomatic HIV-associated cardiomyopathy Reactivation of American trypanosomiasis (meningoencephalitis or myocarditis)

From: World Health Organization. WHO Case Definitions of HIV for Surveillance and Revised Clinical Staging and Immunological Classification of HIV-Related Disease in Adults and Children; 2007.

Appendix 10 Thematic clusters of abstracts/summaries



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Theme: sexual behaviour

THEME: SEXUAL BEHAVIOUR HIV POSITIVE MEN/COUPLES

Ref (Author/year)	Study conducted year	Location & setting	Study design	Sample size & sampling methods	Key findings	Comments
1. Mark L *et al* 2008	June 2003-April 2006	Urban and rural wellness clinic in SA.	Structured survey	3819 HIV-positive patients All consenting patients at time of first clinic visit	• Urban residents were more likely than rural residents to have current regular sex partners • Both male and female with a casual sexual partner were less likely to use a condom consistently with regular partners. • Higher household income and a history of alcohol consumption were predictors of having a regular sexual partner. • With improving health there was potential for risky sexual behaviour	Useful for background and Lit review.
2. Relf M V *et. al* 2009	???	HIV positive urban men in the US	Qualitative, Indepth interviews	18 IDIs Theoretical sampling occurred until theoretical saturation and informational redundancy was	• Participants were "making choices" related to their sexual relationships. • Some men were "avoiding sex" whereas others were engaging in sex in a relationship that was "going	Useful for Lit. Review and (qualitative) methodology

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Appendix 11 Sexual behaviour of HIV-positive men in Africa

	First Author, Year of Publication [Ref. No.]	Study year	Location	Setting	Population	Design	Sample size	% Male	Sampling	Data collection	Sexual behaviour
1	Bunnell 2006, [39]	2003-2004	Uganda	Home based ART	HIV Positive Men & women	Prospective Cohort	926	25.4	Consecutive	Questionnaire	(Sexually active, unprotected sex) in previous 3 months (self report): baseline (47%, 21%), 6 months (53%, 11%), 36 months (72.9%, 30%)
2	Luchters, 2008 [88]	2003-2004	Kenya	Hospital	HIV Positive Men & women	Prospective Cohort	234	36	Consecutive	Questionnaire	Sexually active in preceding year (self report): 90%
3	Olley, 2005 [91]	2004	South Africa	Clinic	HIV Positive Men & women	Cross sectional	149	29.5	Consecutive	Questionnaire	Sexually active in previous 6 months: 75%
4	Bunnell 2008, [40]	2004-2005	Uganda	Household survey	HIV Positive Men & women	Cross sectional	1092	39.2	Consecutive	Questionnaire	Sexually active in preceding year (self report): 86%: Condom use at last sex act: 17%
5	Kiene, 2006 [66]	2005	South Africa	Hospital	HIV Positive Men & women	Cross sectional	152	45.4	Consecutive	Questionnaire	Engaged in forced sex: 13.5%, had casual partner: 8.1%, used alcohol during sex:10.8%
6	Pearson, 2011[68]	2004-2006	Mozambique	Hospital	HIV Positive Men &	Cross sectional	350	34.6	Consecutive	Questionnaire	Sexually active (at ART initiation, 12 months after):

					women						(53%, 71%);concurrent relationship: 16%
7	Iliyasu, 2007 [93]	2005-2006	Nigeria	Hospital	HIV Positive Men & women	Cross sectional	340	25	Consecutive	Questionnaire	Sexually active in preceding 6 months:70.6; casual partners 3%, CSW 0.9%
8	Simbayi, 2007 [73]	2005-2006	South Africa	clinics	HIV Positive Men & women	Cross sectional	1055	39.2	Consecutive	Questionnaire	Sexually active: 90% in past 3 months: 2 or more partners 40%, unprotected sex with concordant, discordant partners (36%, 23%)
9	Kipp, 2011 [52]	2006	Uganda	health centres	HIV Positive Men & women	Cross sectional	199	33.8	Consecutive	Questionnaire	
10	Kalichman, 2007 [50]	Not stated	Botswana	clinics & support groups	HIV Positive Men & women	Cross sectional	500	41.8	Consecutive	Questionnaire	Sexually active: 44%
11	Lurie, 2008 [53]	2003-2006	South Africa	Hospital	HIV Positive Men & women	Cross sectional	3819	23.6	Consecutive	Questionnaire	
12	Apondi, 2011 [35]	2003-2007	Uganda	Home based ART	HIV Positive Men & women	Prospective Cohort	926	25.4	Consecutive	Questionnaire	(Sexually active, sex with casual partners (self report): baseline (47%, 3%), 36 months (73%, 1%)
13	Tumukunde, 2010 [82]	2007	Uganda	Hospital	HIV Positive Men & women	Cross sectional	380	33.4	Systematic	Questionnaire	Sexually active in past 12 months:76%: consistent condom

											use: 49%
14	Wandera, 2011 [80]	2004-2008	Uganda	Hospital	HIV Positive Men & women	Prospective Cohort	559	30.9	Consecutive	Questionnaire	Sexually active: 48% within previous 6 months: unprotected sex: 48.3%: multiple sex partners: 23.1%
15	Ncube, 2012 [59]	2008	Ghana	Hospital	HIV Positive Men & women	Cross sectional	267	16.1	Consecutive	Questionnaire	Sexually active within preceding after testing positive: 47.6%, Consistent condom use: 33.3%
16	Ndziessi, 2013 [62]	2006-2008	Cameroon	Hospital	HIV Positive Men & women	RCT	459	61	Consecutive	Questionnaire	Sexually active at baseline (31.8%), 6 months (40.2%), 12 months (47.1%), 24 months (55.9%): consistent condom use: 18% & 41% among those sexually active before & after; resumed after
17	Venkatesh, 2010 [77]	2003-2009	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	6263	24.7	Consecutive	Questionnaire	(Sexually active, unprotected sex) at pre-HAART visits: (75.2%, 16.8%); Post-HAART: (66.5%, 6.3%)
18	Dessie, 2011 [43]	2009	Ethiopia	Hospital	Sexually active PLWHA	Cross sectional	601	44.9	Consecutive	Questionnaire	Prevalence of unprotected sex: 36.9%: Consistent condom use: 63.1%

19	Kalichman, 2009 [50]	2006-2009	South Africa	STI clinic	PLWHA treated for STI	Cross sectional	1731	60.8	Convinience	Audio computer assisted interviews	Prevalence of unprotected sex in preceding month: 18%
20	Peltzer, 2010 [90]	Not stated	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	735	29.5	Consecutive	Questionnaire	Sexually active: 50% in the previous 3 months: Multiple sex partners (baseleine, 12 months): (9.9%, 7.4%): consistent condom use (baseline, 12 months): (75.9%, 84%)
21	Venkatesh, 2012 [44]	2009-2010	South Africa	Hospital	Sexually active PLWHA	Cross sectional	1163	21.1	Consecutive	Questionnaire	Mean number of coital acts in past 2 weeks: 1.8: HIV status of partners: HIV+(63.2%), HIV-(21.1%), Unknown (15.5%)
22	Ragnarsson, 2011 [70]	2007-2009	Kenya	Clinic	HIV Positive Men & women	Cross sectional	515	32.4	Consecutive	Questionnaire	Two or more partners: 9.5%: consistent condom use: 72%
23	Kakaire, 2010 [49]	2009	Uganda	Hospital	HIV positive men & women	Cross sectional	400	25.3	Consecutive	Questionnaire	Sexually active: 38.2%; Sexual frequency: ≤1/month: 54.2%, 1/week: 27.4%, ≥3/week: 10.7%; Two or more sex partners: 6.9%; partner HIV positive: 84.2%: changed regular partners since HIV

											diagnosis: 35.1%; Regular partner knows respondent's HIV status: 48.8%
24	Iliyasu, 2011 [94]	2009	Nigeria	Hospital	HIV Positive Men & women	Mixed methods	205	44.4	Consecutive	Questionnaire	Sexually active: 39.6% since diagnosis: 32.9% had sex with another person apart from spouse: 91.8% ever used condoms
25	Wamoyi, 2011 [79]	Not stated	Uganda	Hospital	HIV Positive Men & women	Mixed methods	1453	29.5	Consecutive	Questionnaire	
26	Mmbaga, 2013 [55]	2010	Tanzania	Community based	HIV positive men & women	cross sectional	410	35.6	Consecutive	Questionnaire	Having sex with partner: 61.6%; Condom use during last sex: 22.5%
27	Wekesa, 2014 [81]	2010	Kenya	Nairobi slums	HIV Positive Men & women	Mixed methods	513	38	Probability proportionate to size	Questionnaire	Sexually active: 82% in previous 12 months: Condom use at last sex: 70% overall; 73% with regular, 50% with casual
28	McGrath, 2013 [69]	2011	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	632	37	Consecutive	Questionnaire	Median number of sex acts (Pre-ART, ART eligible): 4, 2; Lifetime partners [Median, IQR]:(Pre-ART (5,15), ART eligible (5,13)

29	Kembabazi, 2013 [51]	2005-2011	Uganda	Hospital	HIV Positive Men & women	Prospective Cohort	506	30	Consecutive	Questionnaire	Sexually active at baseline (16%): Prevalence of unprotected sex: Pre-ART visit (16.2%), First on-ART visit (4.3%)
30	Salaudeen, 2014 [41]	2011	Nigeria	Hospital	HIV Positive Men & women	Cross sectional	231	41.1	Consecutive	Questionnaire	Ever used condom: 83.2%
31	Yaya, 2014 [61]	2013	Togo	Hospital	HIV Positive Men & women	Cross sectional	291	28.9	Purposive & comprehensive	Questionnaire	Sexually active: 92.2% since starting ART: Prevalence of unprotected sex: 30.1%

Appendix 12 Fertility behaviour of HIV-positive men in Africa

	First Author, Year of Publication [Ref. No.]	Study year	Location	Setting	Population	Design	Sample size	% Male	Sampling	Data collection	Fertility behaviour
1	Oladapo, 2005 [64]	2004	Nigeria	Hospital	HIV positive men & women	cross sectional	164	31.7	Consecutive	Questionnaire	Fertility desire: 53.8%; Fertility intention 71.5%
2	Nakayiwa, 2006 [56]	2003-2004	Uganda	Hospital	HIV positive men & women	cross sectional	1092	44.7	Simple random sampling	Questionnaire	Fertility desire: 27% among all men; 67% among men with partners
3	Iliyasu, 2007 [93]	2005	Nigeria	Hospital	HIV positive men & women	cross sectional	340	25	Consecutive	Questionnaire	Fertility desire: 61%; Specifically 7.3%, 48.4% and 40.2% wanted 1,2 and 3 children respectively. Three wanted as many as possible
4	Tamene, 2007 [85]	2006	Ethiopia	Hospital	HIV positive men & women	cross sectional	461	47	Consecutive	Questionnaire	Fertility desire: 35.2%; Fertility intention: 42.2%, 57.8% and 43.8% wanted 1, 2 or more
5	Cooper, 2009 [42]	2006	South Africa	Hospital	HIV positive men & women	Cross sectional	459	37.9	Simple random sampling	Questionnaire	57% intend to have children: 7% right now, 3% in 12 months, 39% sometime in the future
6	Kipp, 2011 [52]	2006	Uganda	Health centres	HIV positive men & women	Cross sectional comparative (HAART, not on HAART)	199	33.8	Consecutive	Questionnaire	Fertility desire: 18.2% Contraceptive use: 80.5%

7	Berhan, 2008 [37]	2007	Ethiopia	Hospital	HIV positive men & women on ART	Mixed methods	507	45.8	Systematic	Questionnaire	Fertility desire: 54.2%
8	Apondi, 2011[35]	2003-2007	Uganda	home based AIDS program	HIV positive men & women	Prospective cohort	926	25.4	Consecutive	Questionnaire	Fertilitydesire; baseline 8.5%, endline (6.7%)
9	Beyeza-Kashesya, 2010 [38]	2007	Uganda	Hospital	Sero-discordant couples	Cross sectional	114	50	Consecutive	Questionnaire	Fertility desire: 55% among Man positive couples
10	Erhabor, 2012 [46]	2007	Nigeria	Hospital	HIV positive men & women	Cross sectional	195	45.1	Consecutive	Questionnaire	Fertility desire: 47.7%
11	Tesfaye, 2012 [92]	2007-2008	Ethiopia	Hospital	HIV positive men & women	cross sectional	389	44	Consecutive	Questionnaire	Fertility desire: 49.7%: 25.7% of all clients using Familyplanning method; 42.9% want to use a method in future
12	Getachew, 2010 [47]	2008	Ethiopia	Hospital	HIV positive men & women	Mixed methods	916	50	Simple random sampling	Questionnaire	Fertility intention: 22.4%
13	Heys, 2009 [48]	Not stated	Uganda	Health centres	HIV positive men & women, HIV negative men & women	Comparative Cross sectional	199 HIV+, 222 HIV-	38.7 HIV+, 33.3 HIV-	Systematic	Questionnaire	
14	Kakaire, 2010 [49]	2009	Uganda	Hospital	HIV positive men & women	Cross sectional	400	25.3	Consecutive	Questionnaire	Fertility intention: Male versus Female OR=1.80 (1.00-3.24; P=0.05); Current contraceptive use: 60.4%

15	Mmbaga, 2013 [55]	2010	Tanzania	Community based	HIV positive men & women	cross sectional	410	35.6	Consecutive	Questionnaire	Fertility desire: 39.7%; Mean lifetime desired number=2.4±1.5
16	Abebe, 2012 [33]	2010	Ethiopia	Hospital	HIV positive men & women	Mixed methods	321	29.6	Consecutive	Questionnaire	Fertility desire: 37.9%; contraceptive use:37.9%
17	Wekesa, 2014 [81]	2010	Kenya	Nairobi slums	HIV positive men & women	cross sectional	513	38	Probability proportionate to size	Questionnaire	Fertility desire: 45%
18	Alemayehu, 2012 [34]	2011	Ethiopia	PLWHA volunteers	members of PLWHA associations	Cross sectional	307	60.3	Systematic	Questionnaire	Fertility desire: 41.7%

Appendix 13 Factors associated with sexual behaviour of HIV-positive men in Africa

	First Author, Year of Publication [Ref. No.]	Study year	Location	Setting	Population	Design	Sample size	Factors significantly associated with sexual activity
	Ndziessi, 2013 [62]	2006-2008	Cameroon	Hospital	HIV Positive Men & women	RCT	459	Time since starting ART: aOR(95%CI)=1.30(1.17-1.46)
	Venkatesh, 2010 [76]	2003-2009	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	6263	Being on ART: aOR(95%CI)=0.90(0.74-1.08); Older age: 0.31 (0.27-0.36); needing assistance with daily living: 0.59 (0.50-0.71); urban residence: 1.97(1.71-2.26); and being married/living together: 4.42(3.85-5.08)
	Wekesa, 2014 [81]	2010	Kenya	Nairobi slums	HIV Positive Men & women	Mixed methods	513	Younger age: aOR(95%CI)=3.11(1.01-9.54) for 30-39 years, 3.65 (1.17-11.40) for 40-49 years relative to ≥50 year olds
	Kalichman, 2009 [50]	2006-2009	South Africa	STI clinic	PLWHA treated for STI	Cross sectional	1731	Older age aOR(95%CI):1.1(1.0-1.2); being female 5.9(1.5-23.5); alcohol use 2.5(1.0-6.5); drug use before sex 10.4(1.7-62.4)
	Pearson, 2011[68]	2004-2006	Mozambique	Hospital	HIV Positive Men & women	Cross sectional	350	Disclosure aOR(95%CI): 0.32 (0.12-0.83)
	Ragnarsson, 2011 [70]	2007-2009	Kenya	Clinic	HIV Positive Men & women	Cross sectional	515	Being male: aOR(95%CI)=4.38(1.82-10.51) associated with multiple sex partners
	Simbayi, 2007 [73]	2005-2006	South Africa	clinics	HIV Positive Men & women	Cross sectional	1055	
	Venkatesh, 2010 [77]	2003-2009	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	6263	Being on ART: aOR(95%CI)=0.40 (0.34–0.46)
	Wekesa, 2014 [81]	2010	Kenya	Nairobi slums	HIV Positive Men & women	Mixed methods	513	Being male: aOR(95%CI)=2.41(1.28-4.52); having at least secondary education 0.24(0.007-0.80); disclosure to all partners 0.23(0.11-0.46)

	Peltzer, 2010 [58]	Not stated	South Africa	Hospital	HIV Positive Men & women	Prospective Cohort	735	Being male: aOR(95%CI)=1.7(1.1-2.7); lower education 0.4(0.2-0.8); higher CD4 count 2.6(1.1-6.1); higher stigma 1.2(1.1-1.3); alcohol use at last sex 5.9(1.8-26.1); lower ART adherence 0.5(0.2-0.8)
	Yaya, 2014 [61]	2013	Togo	Hospital	HIV Positive Men & women	Cross sectional	291	Increasing education: aOR (95%CI)=0.10(0.02-0.52); duration of ART 1-3 years 27.08(3.15-233.09), >3 years 10.87(1.29-91.84); alcohol consumption before sex 3.56 (1.31-9.64); non-adherence to ART 2.59(1.21-5.54)
	Olley, 2005 [91]	2004	South Africa	Clinic	HIV Positive Men & women	Cross sectional	149	Shorter duration of illness: aOR(95%CI)=1.2(1.01-1.41); Denial as a coping style 0.6(0.45-0.96)

Appendix 14 Factors associated with fertility desire among HIV-positive men in Africa

	First Author, Year of Publication [Ref. No.]	Study year	Location	Setting	Population	Design	Sample size	Factors significantly associated with fertility desire/intention
1	Abebe, 2012 [33]	2010	Ethiopia	Hospital	HIV positive men & women	Mixed methods	321	Knowledge of high efficacy of ART: aOR (95%CI) =3.7 (1.2-11.7); Discussion with HCW on contraception: aOR (95%CI) = 0.3(0.1-1.0); Belief that partner wants children: aOR (95%CI) =24(9.2-105.4)
2	Cooper, 2009 [42]	2006	South Africa	Hospital	HIV positive men & women	Cross sectional	459	Living in informal settlement (vs. formal house): aOR (95%CI) =2.38 (1.21-4.67)
3	Getachew, 2010 [47]	2008	Ethiopia	Hospital	HIV positive men & women	Mixed methods	916	Being male: aOR (95%CI) =1.78(1.15-2.74); Higher familyincome 2.29(1.23-4.26); Partner's fertility desire 36.4 (17-77.5); Good knowledge of PMTCT 2.26(1.44-3.54)
4	Heys, 2009 [48]	Not stated	Uganda	Health centres	HIV positive men & women, HIV negative men & women	Comparative Cross sectional	199 HIV+, 222 HIV-	Wanting to STOP childbearing associated with : Being HIV positive: aOR (95%CI) =6.25(2.63-14.9); Being female 2.42(1.11-5.28); Inceasing Age 1.13(1.06-1.22); Being of Mutooro ethnicity 3.2(1.39-7.35); higher number of existing children 1.62(1.30-2.03)
5	Kakaire, 2010 [49]	2009	Uganda	Hospital	HIV positive men & women	Cross sectional	400	Increasing age: aOR(95%CI): 0.55(0.43-0.71); being single:

								0.61(0.41-0.90); Child's death:0.48(0.26-0.88);
6	Kipp, 2011 [52]	2006	Uganda	health centres	HIV Positive Men & women	Cross sectional	199	Increasing age: aOR(95%CI): 0.89(0.81-0.97); being male: 3.01(1.10-8.22); Number of living children:0.56(0.39-0.80);
7	Mmbaga, 2013 [55]	2010	Tanzania	Community based	HIV positive men & women	cross sectional	410	Being separated/divorced: aOR (95%CI) =0.5(0.2-0.9); Living with partner 2.5(1.2-3.5); Having sex with partner 4.3(1.2-8.7); Children with current partner 0.5(0.1-0.8); Disclosure of HIV status 9.8(1.2-7.7); Perceived good health status 2.1(1.0-4.4); CD4 count 1.7(1.1-4.3)
8	Nakayiwa, 2006 [56]	2003-2004	Uganda	Hospital	HIV positive men & women	cross sectional	1092	Being female aOR(95%CI): 0.12(0.08-0.20); increasing age 0.27(0.10-0.72); salaried/professional 1.79(1.04-3.09); Number of living children 0.82(0.75-0.90); Think HIV+ women should have children 0.23(0.16-0.36)
9	Myer, 2007 [95]		South Africa					Being male: aOR (95%CI) =2.58 (1.29–5.08)
10	Peltzer, 2008 [90]		South Africa					higher desire at younger age
11	Heys, 2009 [48]	Not stated	Uganda	Health centres	HIV positive men & women, HIV negative men & women	Comparative Cross sectional	199 HIV+, 222 HIV-	higher desire at younger age